1988

Correlates of emotional imagery.

Gernot Gollnisch
University of Massachusetts Amherst

CORRELATES OF EMOTIONAL IMAGERY

A Thesis Presented

by

GERNOT GOLLNISCH

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE

September 1988

Department of Psychology

CORRELATES OF EMOTIONAL IMAGERY

A Thesis Presented

by

GERNOT GOLLNISCH

Approved as to style and content by:

James R. Averill, Chairperson of Committee

Ronnie Janoff-Bulman, Member

Harry Schumer, Member

Seymour M. Berger, Department Head
Department of Psychology

ACKNOWLEDGEMENTS

I would like to thank the members of my committee, James Averill, Ronnie Janoff-Bulman, and Harry Schumer for their continued guidance and support. I am particularly grateful to my advisor and chair, James Averill, who has provided me throughout the study with much constructive criticism and helpful suggestions. I also wish to thank my friends and fellow graduate students Gale Sinatra, Laurie Teraspulsky, and Ken Fletcher for their constant encouragement and support.

The present study was supported, in part, by a grant (MH 40131) from the National Institute of Mental Health to James Averill.

ABSTRACT

CORRELATES OF EMOTIONAL IMAGERY

SEPTEMBER 1988

GERNOT GOLLNISCH, B.A., SONOMA STATE UNIVERSITY

M.S., UNIVERSITY OF MASSACHUSETTS

Directed by: Professor James R. Averill

The study was designed to test the assumption that emotions are socially constructed syndromes or transitory social roles. Unlike the traditional view that emotions are primarily biologically-based reactions, social constructionism considers emotions to be internal representations of social norms and rules. Since emotions are conceived of as transitory social roles, the ability to role-play should faciliate the experience of emotions. To test this assumption, subjects who differed in role-playing ability were asked to imagine themselves in fearful, angry, sad, and joyful situations. Emotional reactivity was assessed by physiological responses and self-reports. As predicted, subjects high in role-playing ability showed greater changes in heart rate and respiration than subjects low in role-playing ability, though they did not differ in self-reported emotional involvement.

In addition, the study was designed to assess specific cognitive strategies people use to become involved in emotional imagery and the extent to which these strategies vary as a function of emotion. Results indicated that

subjects used primarily a visual mode and a participant orientation followed by a verbal and motor mode to elicit emotional imagery in the laboratory. Yet, the success and intensity of the imagery situation was primarily related to a motor strategy. Although subjects used all strategies to become involved in emotional imagery, the extent to which each strategy was used differed substantially among the four emotions. We also found significant differences in the success and intensity with which the four emotions were imagined. Sadness was the most successful and intense emotion to imagine while fear was the least successful and intense emotion.

Finally, the study explored the relationship between emotional reactivity in the laboratory and emotional reactivity in everyday life as rated by subjects and their peers, and the extent to which laboratory findings can be generalized to real-life settings. Our data showed little correspondence between emotional reactivity in the laboratory and subsequent daily ratings of emotional reactivity. The inconsistencies were attributed to the low reliability of subjects' daily ratings.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Over the past three decades interest in human emotions has led to a tremendous increase in scholarly research. The traditional paradigm that has guided most of the research has rested on the assumption that emotions are primarily biologically-based reactions to stimuli; in other words, emotions have become hard-wired into the nervous system during the course of evolution (Izard, 1977; Plutchik, 1980; Tomkins, 1981). It is obvious that a biological perspective on the emotions--as any theoretical framework--addresses a particular set of questions which, in turn, will lead to certain predictions and conclusions. To that extent, the biological viewpoint has placed very little emphasis on questions pertaining to the social and cultural contexts within which emotions are experienced.

Emotions as Social Constructions

In contrast to the biological perspective, the social-constructionist view of emotion, as put forth by Averill (1974, 1976, 1980a, 1980b, 1982), considers emotions to be based on internal representations or schemata of social norms and rules. These internalized norms and rules provide the basis for the appraisal of stimuli, the

organization of responses, and the monitoring of behavior. Emotions can therefore be thought of as socially constituted syndromes or transitory social roles.

Four major assumptions underlie the constructionist view. "First, emotions are responses of the whole person, and hence cannot be defined in terms of subclasses of responses (e.g., physiological or expressive reactions, cognitive appraisals, instrumental acts, or subjective experience). Second, emotions are complex, polythetic syndromes; that is, no subset of elements or kind of response is a necessary or sufficient condition for the whole. Third, the rules that govern the organization of the various elements of the syndrome are primarily social in origin. Fourth, emotions serve a function within the social system, or at least are correlated with other behaviors that have a social function" (Averill, 1983, p. 1146). Given these assumptions it is acknowledged that biological determinants are part of the whole syndrome and can place constraints on the organizing rules of emotional syndromes; however, the source and, consequently, the explanation of emotional syndromes emerges out of social rather than biological evolution.

Role-Playing Ability

Since emotional syndromes can be conceived of as transitory social roles, it is plausible that individuals

who can easily adopt different roles exhibit a broader emotional spectrum in everyday life than people for whom roles are difficult to assume; in other words, good role-playing skills ought to facilitate the experience and expression of emotions in everyday affairs. Hence, if the ability to role-play is a personality trait that is related to emotional reactivity it would support the social-constructionist view of emotion.

Support for the presumed relationship between role-playing ability and the experience and expression of emotions has come primarily from areas outside traditional experimental psychology, as outlined by Averill (1984): Books on acting provide particularly insightful analyses of emotions (Edwards, 1965; Moore, 1973; Stanislavski, 1936). For example, techniques of "method" acting proposed by Stanislavski encourage the actor to completely identify with the role being played, both mentally and emotionally. Of course, stage emotions differ from real-life emotions. The good method actor appraises his or her onstage emotions differently from similar emotional situations experienced in everyday affairs. The emotions are real in both situations; however, the onstage situation does not have an emotional impact on the actor beyond the particular scene being played. Yet, the same ability may be required to enter into the appropriate emotional roles on and off stage.

Several forms of psychotherapy, e.g., psychodrama (Yablonsky, 1976), Gestalt therapy (Perls, 1973), and certain forms of behavior therapy (cf. Bandura's, 1977, "participant modeling") use role-playing as the primary technique to modify emotional reactivity. In these instances, role-playing is used not just to alter the expression of inappropriate emotional responses, but also to facilitate the experience of appropriate emotions. Thus, people who do learn to experience emotions through role-playing techniques often receive training that is not unlike that of an actor.

In laboratory situations the ability to role-play has been related to dispositional measures of emotionality as well as to emotional reactions in real-life situations. For example, in a study by Willerman et al. (1976), emotional traits were related to emotional role-playing in the laboratory; and Novaco (1975) found that role-play anger in the laboratory is related to responses to provocations in everyday affairs.

The relationship between role-playing ability and emotional reactivity has also been found in studies of hypnosis. There are important similarities between some hypnotic phenomena and the experience of emotion, e.g., the seeming loss of control over one's own behavior, a limited dissociation of consciousness, etc. Sarbin and Coe (1972) have found that people who are adept at role-playing also tend to be good hypnotic subjects. The same may also be

true in the case of normal emotional reactions, where social norms and "demand characteristics" are even more salient than in the case of hypnotic responses.

In order to directly test the relationship between role-playing ability and emotional reactivity Fletcher and Averill (1984) developed a role-playing scale (the scale will be described in greater detail in a later section). In a preliminary study, the frequencies of emotional experiences (18 different emotions) of 150 subjects were compared to scores on various personality inventories, i.e., the Role-Playing Scale, the Eysenck Personality Inventory (Eysenck & Eysenck, 1968), and the Self-Monitoring Scale (Snyder, 1974). For the period of one week subjects indicated daily how frequently they experienced and expressed each of the 18 emotions. Despite only modest correlations (generally below .30), it was found that role-playing ability was superior in predicting emotional reactivity over neuroticism, extraversion, and self-monitoring. Although this was true for the majority of the 18 emotions, role-playing ability did not correlate with anger, fear, sadness, and hope, for which neuroticism was a better predictor, and joy, for which extraversion was superior.

Fear, anger, sadness, and joy are often the prime focal point in emotion research, since they are considered to be among the most basic of human emotions. If role-playing ability is indeed unrelated to these emotions it

would seriously question the validity of the social construction of emotion. One shortcoming of the pilot data collected by Fletcher and Averill was its sole reliance on subjects' self-report data of emotional reactivity in an environment that did not allow for any experimental control. What was needed then was an assessment of role-playing ability and its relationship to emotional reactivity when emotions are evoked under more controlled circumstances in the laboratory. To this end, mental imagery was chosen as a simple yet effective way to induce emotions in the laboratory without any substantial risks to the subject (Lang, 1979; Schwartz, Weinberger, & Singer, 1981; Brown & Schwartz, 1980; Stern & Lewis, 1968). Furthermore, using imagery as a medium for emotional reactivity provided an opportunity to identify the cognitive strategies people use to involve themselves emotionally in a situation and whether those strategies varied with the type of emotion. To counteract some of the problems associated with self-reports of emotions, psychophysiological measures were selected as an independent nonverbal indicator of emotional reactivity.

Emotional Imagery

The value of emotional imagery was first recognized by behavior therapists working with patients who suffered from phobias and other anxiety disorders, and it proved to be

particularly effective with systematic desensitization, covert sensitization, and flooding procedures (Wolpe, 1958; Rachman, 1973; Kraft, 1970; Friedman, 1966; Lazarus & Abramowitz, 1962; Singer, 1974). Soon after, researchers interested in autonomic arousal adopted emotional imagery as a way to ascertain physiological arousal patterns for different emotions (Grossberg & Wilson, 1968; Lang, Melamed, & Hart, 1970; Haney & Euse, 1976; Schwartz, Fair, Salt, Mandel, & Klerman, 1976). Some of these findings will be discussed in a later section.

To date, Lang's bio-informational model is the most comprehensive theory of emotional imagery (Lang, 1977, 1979; Lang et al., 1970; Weerts & Lang, 1978). It postulates that an image is a conceptual structure composed of propositional units. In emotional imagery the propositional network not only organizes stimulus input but also somato-visceral information, the conceptual network thus has the functional properties of a perceptual-motor set encoding both stimulus and response elements (for further details of the bio-informational model see Appendix A).

Lang's bio-informational theory has received much support with respect to stimulus and response propositions (Bauer & Craighead, 1979; Hermecz & Melamed, 1984; Dekker & Everaerd, 1988a). Despite the support, the theory is not without its limitations. The theory was developed with an aim towards clinical applications, particularly phobic and

anxiety disorders. Consequently, Lang and his collaborators occasionally preselected subjects who experienced high levels of fear or social anxiety. Moreover, the model has rested largly on the study of one emotion, namely fear, or in the case of Dekker and Everaerd, on sexual arousal, both of which tend to show higher somato-visceral activity than most other emotions. Nevertheless, Lang and his associates have shown that response-oriented imagery instructions increase physiological arousal during emotional ideation.

Cognitive Strategies of Emotional Imagery

Most psychologists today have acknowledged emotional imagery as a legitimate field of study, though systematic research in that area, with the exception of psychophysiological studies, is still in its infancy. In the late 1960´s and 70´s cognitive psychologists have focused increasingly on mental imagery and its effect on verbal learning, language comprehension, and memory (Paivio, 1969, 1971; Ernst & Paivio, 1971). Many of the self-report measures used in these studies, variables such as clarity, controllability, concreteness, intensity, vividness, etc., were mostly indices of image structure. When imagery was adopted with research on emotions most studies employed the very same variables (Euse & Haney, 1975; Haney & Euse, 1976; Bauer & Craighead, 1979;

Stricklin & Penk, 1980; Carroll et al., 1982; Roberts & Weerts, 1982; Lang, Kozak, Miller, Levin, & McLean, 1980; Richardson & Taylor, 1982). While these studies have greatly increased our knowledge of the **imagery** of emotional scenarios, they tell us very little about the quality of the evoked emotion and the possible variations between specific emotions. With the exception of intensity, the self-report measures used in the above studies refer exclusively to image quality. But more importantly, they do not illustrate the strategies and mechanisms by which subjects are able to become emotionally involved through imagery.

We have said earlier that from a social constructionist perspective emotions are conceived of as transitory social roles and that imagery may serve as a means to elicit emotions in the laboratory. To this end it was of particular importance **how** people become involved in an emotional role. In other words, what are the cognitive strategies people use to elicit emotions through imagery and to what extent do the strategies vary among different emotions?

There seems to be a general consensus that emotional imagery is by and large a visual activity as evidenced by the imagery instructions to **visualize** scenes (Haney & Euse, 1976; Bauer & Craighead, 1979; Lang et al, 1980). However, visual images are but one form of imagery. Moreover, a highly vivid visual image is not necessarily an indicator

for an intensely emotional experience. Early on, Betts (1909) in his Questionnaire Upon Mental Imagery identified seven different modes of imagery, and though they do not specifically refer to emotional experiences they nevertheless are pertinent to it; thus, for example, an olfactory mode of imagery might evoke great feelings of joy and comfort when one recalls the smell of fresh-baked bread or pie in one´s childhood home, or in the case of auditory imagery, recalling a heated discussion with a friend can elicit feelings of anger and frustration. Neither one of these situations necessarily requires visual imagery in order to be emotionally arousing. Yet it seems most likely that, in general, emotional imagery is a function of not one but a combination of modes weighted differently according to individual imagery abilities, the type of emotion to be evoked, the particular situation chosen to imagine, and the significance of the situation to the imager. Evidence for the combination of imagery modes comes from Sokolov (1972) who has shown that even highly visual images frequently include verbal activity. The presence of such "covert speech" during visual imagery was measured by electrical activity in the speech musculature. The question then arises what kinds of strategies (i.e. modes of imagery) do people use to become involved in an emotional situation and do they vary with different emotions? For example, to relive the anger and frustration that one felt during an argument with a friend might

require a combination of visual imagery--visualizing the friend and the environment in which the incident occurred, verbal or auditory imagery--becoming aware of the arguments that were exchanged, and motor imagery--clenching fists, tensing muscles, etc. In addition, each imagery mode might or might not contribute equally to inducing the emotion, that is for anger one might rely more on a verbal and motor mode of imagery than a visual mode, but to evoke fear one might rely more on a visual and motor mode than a verbal mode.

We mentioned that the literature has focused mostly on visual imagery and there is a surprising absence of studies comparing modes of imagery with different emotions. Yet, the strategy to use a visual-, verbal-, or motor mode of imagery to become involved in an emotional situation is only one aspect of the imagery process. Equally important is the orientation an individual adopts to imagine a particular scene, be it that of a participant or an observer. Again, the trend in studies on emotional imagery has been to instruct subjects to actively project themselves into the scene, thus to act as participants in the situation. The assumption is that a participant orientation will elicit more vivid images and hence more intense emotions. On the other hand, an observer orientation which requires an individual to imagine a situation as one would watch a TV or movie screen, has never been given much consideration. Only one study

compared a participant versus an observer orientation. Applying Lang's bio-informational model, Bauer and Craighead (1979) instructed subjects to either attend to stimulus elements or response elements during imagery of fearful and neutral scenes while adopting either a participant orientation or an observer orientation. The conditions were crossed to yield four experimental groups: stimulus-participant, stimulus-observer, response-participant, and response-observer. They found no differences between a participant and observer orientation in self-report ratings on mood changes, vividness, and controllability of images. The two imagery orientations also did not differ in heart rate changes and finger pulse-volume, and skin conductance was only marginally significant. A participant orientation showed an increase in skin conductance whereas an observer orientation produced a slight decrease. It appears then that an observer orientation during emotional imagery is as effective in producing vivid images and mood changes as a participant orientation, although additional studies are needed to confirm these results, particularly with respect to different emotions.

Psychophysiological Correlates of Emotional Imagery

Over the last two decades numerous studies have been conducted on the psychophysiological reactivity during

emotional imagery. Measures have been taken from a wide range of physiological responses, the most frequent measures being heart rate, blood pressure, respiration, skin conductance, and electromyograph (EMG) activity. In general, findings have confirmed the hypothesis that imagery of affective stimuli generates a greater increase in efferent activity than imagery of neutral stimuli (Grossberg & Wilson, 1968; Haney & Euse, 1976; Bauer & Craighead, 1979; Lang et al., 1980). Evidence of physiological reactivity during emotional imagery has been the strongest and most consistent for heart rate but least consistent for skin conductance (Barber & Kahn, 1964; Lang, Melamed, & Hart, 1970; Weerts & Lang, 1978; Marzillier, Carroll, & Newland, 1979, Hermecz & Melamed, 1984).

Unfortunately, most research on the physiological correlates of emotional imagery has centered around one emotion, fear, usually comparing fear versus neutral imagery; other, less specific emotion categories have included arousing versus relaxing imagery, or positive versus negative imagery.

Schwartz and his collaborators have systematically compared the physiological arousal patterns of specific emotions such as fear, sadness, anger, and happiness. Their research has shown that different affective states during imagery are associated with different patterns of cardiovascular activity and facial EMG activity (Schwartz

et al., 1981; Schwartz, Brown, & Ahern, 1980; Brown & Schwartz, 1980, Fridlund, Schwartz, & Fowler, 1984).

In the present study we recorded subjects' heart rate, respiration, and skin conductance as indices of physiological arousal during imagery. Though skin conductance has produced less consistent results with emotional imagery (Lang et al., 1980; Lang, Levin, Miller, & Kozak, 1983; Carroll, Marzillier, & Merian, 1982; Weerts & Lang, 1978), a study by Stern and Lewis (1968) found that method actors had greater voluntary control over their galvanic skin responses (GSR) during emotional ideation than non-method actors. Thus, we included skin conductance as a measure of emotional imagery in light of its potential relationship to acting ability. The physiological measures provided an objective indication of emotional reactivity during imagery and served as a control to the more subjective self-report measures.

Emotions as Everyday Experiences

The question might be raised whether imagery of emotional situations in the laboratory is an appropriate representation of emotional reactivity outside the laboratory. The experience of emotional imagery in the laboratory does not necessarily indicate an ability to emotionally respond in everyday situations. If this is true, then the study of emotional reactivity in the

laboratory is of little value if one is concerned with how people respond emotionally in everyday life. Does imagery play a role in emotions as they are experienced in daily life? Several theories of emotion have postulated a close connection between imagery and emotion (Arnold, 1970; Izard, 1977; Solomon, 1977; Mandler, 1984; Plutchik, 1984; Lyman, 1984). Lyman in particular has argued for a central role of imagery in emotional experiences and has defined emotions as "conscious experiences characterized by a dynamic pattern of imagery and accompanying affect and by particular experiential themes" (Lyman, 1984, p. 78). In a study by Lyman, Bernardin, and Thomas (1980), subjects were asked to recall and imagine a situation that was highly emotional and a similar situation in which no emotion was experienced. Subjects then wrote down the descriptions of their experiences with special attention to the images evoked. Two independent raters tallied the frequency and variety of images defined as copies, revivals, or memories of sensory experience. The images were classified into nine categories: past, present, future, activities, events, people, places, self, and things. It was found that the frequency of images was greater for emotional situations than non-emotional situations. Furthermore, in the emotional condition images with references to the past or future were more frequent than images with references to the present. Similarly, frequency of images was greater for activities vs. events or things, and people vs. self.

On the basis of this evidence the authors suggest that images play a significant role in the experience of everyday emotions. However, since their study only involved the recall of emotional versus nonemotional situations in the laboratory, the accuracy of this suggestion remains to be demonstrated.

Of additional concern is the fact that emotional reactivity as it is generally assessed in the laboratory is limited primarily to an intensity dimension and yet, in everyday affairs, the intensity of emotional experiences may vary independently of the frequency and range of experiences (Sommers, 1981; Strelau, 1982; Wessman & Ricks, 1966). To assess this possibility, the present study obtained, in addition to laboratory measures, ratings of subjects' everyday emotional experiences over a two-week period following the laboratory phase. An independent measure of subjects' emotionality outside the laboratory was provided by peer ratings of emotional reactivity, though ratings referred to emotional propensities rather than actual experiences. The relationship between peer reports and self-reports is an issue of considerable interest in its own right (cf. Cheek, 1982). Traditionally, however, peer ratings have suffered from problems of poor reliability, low validity, and rater biases (Kane & Lawler, 1978). Hence, peer report data in the present study were primarily of an exploratory nature.

Personality Assessment

In testing the role-playing hypothesis through emotional imagery several personality inventories were selected to measure emotional reactivity and imagery ability and style.

Form B of the Eysenck Personality Inventory (EPI, see Appendix B) was used as a measure of extraversion-introversion and neuroticism. The Neuroticism Scale (NS) is a commonly used measure of emotionality though it is primarily indicative of negative emotions. Eysenck has postulated that neuroticism is related to activity in the limbic and autonomic nervous system. Thus conceptually neuroticism, as a measure of emotional reactivity, finds its origins within the biological evolution. This stands in direct contrast to the social constructionist assumption that specific emotional syndromes are predominantly of social origin. The question then is whether role-playing ability is more closely related to the ability to become emotional aroused than is neuroticism.

The Role-Playing Scale (RPS; see Appendix C) is a 40-item paper-and-pencil test that has proved to be a convenient and reliable measure of an individual´s role-playing ability. The RPS showed good predictive validity and both internal consistency and test-retest reliability were satisfactory, .84 and .80 respectively (Fletcher & Averill, 1984).

It should be mentioned that the Role-Playing Scale was primarily constructed to explore the relationship between role-playing ability and emotional reactivity; therefore, none of the items in the scale refer specifically to feelings and emotions.

The Affect Intensity Measure (Larsen, 1984; see Appendix D) was selected as an additional measure of emotional reactivity, with an emphasis on intensity. Diener, Larsen, Levine, and Emmons (1985) have argued that affect intensity in response to emotion-provoking stimulation is a stable personality characteristic that applies to both positive and negative emotions. The Affect Intensity Measure (AIM) has shown high internal consistency (Cronbach's coefficient alpha ranging from .90 to .94 over four samples) and good test-retest reliability ($r = .81$) over a three-month period. Correlations between the AIM and physiological arousal have found a significant negative correlation between resting heart rate and resting electrodermal activity (Larsen, Diener, & Emmons, 1986). Larsen et al. suggested that, consistent with Petrie's (1967) stimulus intensity modulation theory, physiologically underaroused individuals might compensate with higher affect intensity to maintain optimal arousal levels. The AIM also correlates significantly with self-reported personality traits, including extraversion and neuroticism (Larsen & Diener, 1987).

The Individual Differences Questionnaire (IDQ) was originally constructed by Paivio (1971; see Appendix E) to assess a person's imaginal and verbal thinking habits. The questionnaire is comprised of 86 true-false items and yields separate scores for the imagery and the verbal scale. Paivio has found no inverse relationship between scores obtained from the two scales, indicating that imaginal thinking is not the reciprocal of verbal thinking. In a later factor analytic study on the original data, Paivio and Harshman (1983) found a habit factor only for imaginal thinking while verbal thinking produced an ability factor. This might explain the lack of a negative correlation between the two factors. Psychometrically, the IDQ has proved to be quite satisfactory. Hiscock (1978) has found good internal consistency for the original IDQ (Cronbach's coefficient alpha was .80 for the imagery scale and .83 for the verbal scale). Hiscock then developed a shortened version of the IDQ containing 72 items and a Likert-scale response format and was able to increase internal consistency to .87 for the imaginal and .88 for the verbal scale together with a test-retest reliability of .84 and .88 respectively.

One of the main objectives of the present study was to investigate the cognitive strategies people used to become emotionally involved through imagery. Two of the anticipated strategies, visual and verbal mode of imagery,

should be reflected in the two information processing styles measured by the IDQ.

The shortened form of the Betts Questionnaire Upon Mental Imagery (QMI; Sheehan, 1967a; see Appendix F) is one of the oldest and most widely used imagery measures. Reliability studies conducted by different investigators reported Cronbach alphas ranging from .90 to .94 and test-retest reliabilities ranging from .72 to .91 (Westcott & Rosenstock, 1976; Sheehan, 1967b; Evans & Kamemoto, 1973). Despite its frequent use, however, the Betts is not without drawbacks. White et al. (1974, 1978) have shown that the format of the Betts is susceptible to response biases. Nevertheless, we chose the Betts QMI to determine subjects' imagery abilities. The rationale for using the Betts was twofold: 1) since imagery is used to elicit emotions in the laboratory, differences in becoming emotionally involved might appear along good and poor imagery abilities rather than role-playing ability (assuming that the two traits are uncorrelated), and 2) imagery ability might be directly related to role-playing ability which raises important questions about the explanation of role-playing ability and emotional imagery.

Summary

Following is a brief summary of the major aspects of the study. The present experiment was designed to:

1) Test the social-constructionist theory of emotion by way of role-playing ability and emotional imagery in the laboratory. Data were collected on ideation of fear, sadness, anger, and joy through self-report measures and physiological recordings. The hypothesis was that persons who score high on the Role-Playing Scale would show greater physiological and self-report indices of emotional arousal than persons low on the scale. The study also assessed the relationship between emotional imagery and other personality traits.
2) Assess specific cognitive strategies people use to become involved in emotional imagery and the extent to which these strategies vary as a function of emotion. The strategies were selected a priori on conceptual grounds. No prediction was made with regard to possible differences in induction strategies.
3) Explore the relationship between emotional reactivity in the laboratory and emotional reactivity in everyday life as rated by subjects and their peers, and the extent to which laboratory findings of emotional imagery can be generalized to real-life settings. In addition, the study explored the relationship of role-playing ability and other personality traits to emotional reactivity in everyday life. This aspect of the study constituted a replication of a pilot study by Fletcher and Averill (unpublished data).

CHAPTER II

METHOD

Overview

The study consisted of three phases, each of which will be discussed briefly below.

Phase I

During the first or pretesting phase, booklets containing four personality scales were given to groups of 20 to 30 students at a time. These scales--the Role-Playing Scale, Eysenck Personality Inventory, Affect Intensity Measure, and Individual Differences Questionnaire--have been described in the introduction. Attached to each booklet was a brief description of another study the experimenters were conducting (see Appendix G), for which subjects were able to sign up. Unbeknownst to subjects, the described study was not a separate one but did in fact comprise phases II and III of this experiment. To be eligible to participate in phase II, subjects had to score in the upper or lower quartile on the Role-Playing Scale.

Phase II

During the laboratory session, subjects were asked to imagine five emotional situations. On the first trial all subjects were asked to imagine a tranquil situation. The purpose of the tranquility condition was to help participants become acclimated to the experimental procedures; data from this trial were not included in subsequent analyses.

The four target emotions--fear, sadness, anger, and joy--were then presented in counterbalanced order, forming a latin square design (see Appendix H). Subjects were randomly assigned to one of the four sequences of emotions. The design was repeated for groups of subjects high and low in role-playing ability. Physiological responses (heart rate, electrodermal activity, and respiration) were recorded continuously throughout the session on a Beckman Type RM Dynograph.

Phase III

Before each subject was dismissed from the laboratory session they were given a manila envelope containing forms on which they were to record their everyday emotional experiences for a period of two weeks (see Appendix I). Each form listed 18 commonly experienced emotions. At the end of each day subjects were to write down the frequency with which they experienced each of the listed emotions and to rate the intensity (on a 5-point scale) of the most

intense episode of each emotion on that particular day. At the end of the two-week period the forms were returned to the experimenter. In addition, subjects were required to give an envelope containing a peer rating scale to four of their closest friends or relatives (see Appendix J). The rating scales included several questions on general personality characteristics as well as a list of the same 18 emotions. The acquaintances rated the subjects' tendency to experience the 18 emotions. The completed peer rating scales were sent back to the experimenter by mail. Subjects received payment and written feedback (see Appendix K) at the time they returned their rating scales.

Subjects

Subjects in phase I were 605 undergraduate students (215 males and 390 females) enrolled in psychology classes at the University of Massachusetts. The criterion for participation in phase II (laboratory session) and phase III (two-week follow-up of students' everyday emotional experiences) was a score in the upper or lower quartile of the distribution of scores on the Role-Playing Scale (phase I). Individuals with a reported history of cardiovascular problems or who, at the time, were using drugs or medication also were excluded from participation in phase II of the study, since these conditions could contaminate physiological response measurements (Andreassi, 1980).

Subjects received class credit for their participation in phase I and a $20 payment for their participation in phases II and III.

It was originally intended to select an equal number of male and female subjects for phase II and III. However, due to the fact that participation in this study was voluntary and few male students were willing to sign up for the second phase, the experimental session and subsequent follow-up was confined to female students only. Among the female subjects who signed up for phase II of the experiment, 40 scored within the upper quartile of the Role-Playing Scale and 32 subjects scored within the lower quartile, leaving a total of 72 participants.

Procedure (Phase II)

Subjects who met the criterion on the Role-Playing Scale were invited back for the experimental session. Upon individually reporting to the laboratory, the subject was greeted by the experimenter and led into a windowless and sound-deadened room. The experimenter was unaware of whether a subject belonged to the high or low role-playing group. The participant was asked to sign a consent form which gave a brief account of the procedures to be followed in the experiment (see Appendix L).

Once the subject was seated comfortably in a reclining chair she was given the following instructions:

"We are interested in the ability of people to become involved in emotional situations through imagery. As you already read in the informed consent form, you will be asked to imagine five episodes, one at a time, involving anger, sadness, fear, tranquility, and joy. As one measure of emotional involvement, some physiological responses will be recorded, such as your heart rate, skin conductance, and respiration. I will explain the physiological measures more fully as each transducer is attached. In addition, you will be asked to rate your emotional experiences on a brief rating scale following each trial. When all trials have been completed I will ask you to fill out some additional questionnaires about your experiences. Do you have any questions thus far?"

The experimenter then explained the various physiological recording devices to be used in the experiment. While the electrodes for heart rate, skin conductance, and respiration were attached, the subject was encouraged to ask any questions pertaining to these devices. Furthermore, the experimenter engaged the subject in a light conversation, asking all subjects the same questions about their course work and college life in general. These conversations were intended to make the subject feel more at ease and to reduce the nervousness in light of the attached electrodes and wires. After all transducers were securely in place the subject was told:

"OK, all transducers are in place. I will now go to the adjoining room to calibrate the recording devices. This procedure will take about ten minutes. In the meantime, sit back and relax, but do not fall asleep. Since I am in the room next door I will talk to you over the two-way intercom for further instructions. If you have any questions, just ask; I can hear you over the intercom. Any questions before I leave? OK. Get comfortable, but please don't move any more than necessary."

At this point the rating scales together with a clipboard and a pencil were placed next to the subject. The experimenter then dimmed the lights and retired to the adjoining room. Once calibration procedures were completed the subject was allowed an additional two-minute rest period during which physiological baseline levels for the first trial (tranquility) were established. The subject was told to relax as much as possible during the two-minute rest period.

Each imagery condition was composed of three separate sections: 1) a two-minute rest period during which physiological baseline levels were established, 2) a 45-second instruction period together with a two-minute imagery trial (cf. Davidson & Schwartz, 1976; Schwartz, Weinberger, & Singer, 1981; Ketterer, 1982), and 3) a self-report rating period of approximately two minutes.

At the end of the rest period the subject was instructed in the following manner:

> "For this trial you are to imagine being in a **tranquil** situation. For example, imagine lying on the beach on a warm summer day, or relaxing before a fire, or listening to soothing music. I want you to become involved in the situation as intensely as possible. You can either pick one of the situations I just mentioned, or you can imagine one that you choose on your own. Imagine how you might feel and what you might do in the situation. In other words, try to experience the situation as though it were real. The trial will last two minutes. I will let you know when the two minutes are up. Please try to avoid any body movements since they could give us incorrect physiological recordings. Again, imagine yourself in a completely tranquil state, try to imagine the

emotion as though it were actually happening. All right, begin now."

The above instructions were repeated for each subsequent trial, with a different emotion substituted where relevant:

For anger: For this trial you are to imagine being in an intensely **angry** situation. For example, imagine you are insulted unfairly in front of others; or, as another example, you find out that someone intentionally is spreading false rumors about you; or imagine that your apartment has been burglarized...

For fear: For this trial you are to imagine being in an intensely **fearful** situation. For example, imagine you are standing on the edge of a high cliff and feel the earth give way beneath you; or, as another example, you are suddenly called upon to speak before a large group without time to prepare; or imagine that you are diagnosed as having incurable cancer...

For sadness: For this trial you are to imagine being in an intensely **sad** situation. For example, imagine a close friend of yours has died; or, as another example, your boyfriend is moving to another town and you won't see him for months; or imagine you see a little child suffering from a painful disease...

For joy: For this trial you are to imagine being in an intensely **joyful** situation. For example, imagine meeting a good friend whom you haven't seen for a long time; or, as another example, you are receiving an unexpected gift from someone dear to you; or imagine you are receiving an award for a project on which you have devoted a lot of work...

Following each imagery trial the subject was instructed to fill out a short rating scale on her experiences during the preceding trial (see Appendix M). The items on the scale were related to the subject's emotional reactivity during imagery and are described in the next section.

At the completion of the last trial the subject was again instructed to sit back and relax for a couple of minutes until the experimenter was ready to disconnect the transducers. When the subject was relaxed, a reflex-like measure of general autonomic reactivity (startle) was obtained by unexpectedly presenting a one-second, 90 db (measured at ear level) blast of white noise over a loudspeaker placed behind the subject. The experimenter then entered the room and detached the transducers from the subject. The subject was then asked to write a brief description of each emotional situation that she chose to imagine (see Appendix N). Each participant also completed a more detailed questionnaire on each imagery experience and strategies for emotional involvement (see Appendix O).

Finally, the subject was asked to complete the Betts' Questionnaire Upon Mental Imagery to determine her imagery ability.

Dependent Variables (Phase II)

All dependent variables were divided into two main categories: measures of emotional reactivity and strategies for emotional involvement. The first category consisted of (a) self-report measures, and (b) physiological responses. The second category consisted of self-report measures designed to assess (a) mode of imagery, (b) orientation of imagery, and (c) source of imagery. All self-report items

were rated on a 5-point scale for each of the target emotions.

Measures of Emotional Reactivity

Self-Reports

Following each trial, subjects were asked to rate, on a scale from one to five, one question related to involvement in the emotional situations: To what extent were you **able** to become involved in the experience (1--not at all, 5--very definitely).

In addition, subjects rated their dominant emotions during the trial on a 20-item adjective checklist. Based on pilot testing, four adjectives were selected to assess each of the imagined emotional states. These were **tranquil**, calm, peaceful, relaxed; **fearful**, scared, jittery, afraid; **sad**, depressed, sorrowful, gloomy; **angry**, annoyed, furious, fed up; and **joyful**, elated, happy, jubilant. Mean ratings of the four terms denoting a target emotion were calculated for each trial.

Subjects also rated (retrospectively) the **intensity** of the emotional experience during the first, middle, and last thirds of each two-minute trial (1--not at all intense, 5--as intense as this emotion could be experienced in real life). In addition, a mean intensity rating for each trial was calculated by averaging over the three thirds.

In the more extensive questionnaire at the end of the experiment subjects were asked two additional questions

about their emotional involvement: 1) How **successful** were you in becoming involved in the emotional situation (1--not at all successful, 5--extremely successful); and 2) How much **effort** did it take to get involved in the emotional situation (1--no effort, 5--a great deal of effort). The first question served as an indicator of reliability between ratings of emotional involvement immediately following each trial (ability, see above) and ratings provided at the end of the experiment (success). Both variables are conceptually identical.

Physiological Measures

Recordings of heart rate, electrodermal activity (skin conductance), and respiration provided nonverbal measures of emotional reactivity. Readings were taken during each imagery trial and the preceding rest period. For each physiological variable, reactivity measures were established by dividing the two-minute imagery trial into three segments of 40 seconds each (three thirds). Baseline measures were taken during the last 40 seconds of the two-minute rest period.

Heart rate. Heart rate was measured via plate electrodes placed in Lead I position (wrists of left arm and right arm) and was directly recorded in beats-per-minute (bpm) using a Beckman cardiotachometer (Type 9857). Within each 40-second segment (third) of the imagery trial four readings were taken. Each of the four readings

comprised the highest heartbeat at a 10-second interval. For purpose of data analysis, these readings were averaged to yield one measure for the first third, middle third, and last third of the imagery trial. A baseline measure for each condition was obtained by averaging the four highest heart rate recordings during the last 40-second segment of the rest period, before the instructions for that trial. Heart rate data were converted to change scores by subtracting the baseline score from the score for each third of the trial.

Electrodermal activity. Using a Beckman coupler Type 9842, skin conductance was measured directly by impressing a constant 0.5 volts across Beckman silver/silver chloride electrodes attached to the thenar and hypothenar surfaces of the palm of the non-dominant hand. Johnson and Johnson K-Y Jelly was used as a contact medium. One reading was taken at the midpoint of each third (40-second segment) of an imagery trial. Baseline levels were established by taking a reading at the end of the rest period. Skin conductance data were converted to change scores by subtracting baseline scores from the scores obtained for each third of a trial. However, before skin conductance data were converted to change scores they were transformed to logarithms (base 10) to reduce the heavily skewed distributions.

Respiration. Respiration was recorded by means of a strain-gauge placed around the subject's chest slightly

below the sternum. Respiration was measured by counting the number of breathing cycles (to the nearest tenth of a cycle) within each 40-second segment of the imagery trial. Baseline measures were established by counting the number of cycles during the last 40 seconds of the rest period. Respiration data were converted to change scores by subtracting baseline scores from the scores obtained for each third of a trial.

In addition to respiration rate, respiration was also checked for irregularity. This was done by inspection of the records. If the amplitude of the deepest breath exceeded the amplitude of the shallowest breath by a factor of two, and if this occurred more than once within a segment, then respiration was recorded as irregular (0--regular or smooth respiration, 1--irregular respiration).

For all three physiological measures, means for each imagery trial were calculated by averaging the scores obtained from each of the three segments (thirds) of the trial. Correlations of change scores with their respective baseline levels were computed for each measure and are listed in Appendix P. The majority of the correlations were below $r = .30$; it was therefore unnecessary to perform an analysis of covariance. Baseline levels for the three physiological measures did not differ significantly as a function of condition (target emotion).

Strategies for Emotional Involvement

At the completion of all trials, after the transducers had been removed, subjects filled out the questionnaire that contained the items pertaining to strategies for emotional involvement.

Mode of Imagery

Three modes of imagery (visual, verbal, and motor) were defined as follows. A **visual** mode refers to a strategy where subjects picture or visualize an emotional situation. A **verbal** mode, on the other hand, is used when subjects think or talk about an episode to themselves. A **motor** strategy employs such physical manifestations as grimacing, smiling, crying, fist clenching, rapid breathing, etc. The extent to which subjects believed they used each mode was assessed on a 5-point scale (1--not at all, 5--very much).

Orientation of Imagery

There are two main orientations a person may adopt with respect to an imagined episode, namely, as an observer or a **participant**. Being an observer to an imagined situation presumes the retention of a certain distance, and can be likened to viewing a movie or reading a book; being a participant assumes that the person actually enters the imagined situation and is present as though the event were

happening in real life. Each orientation was assessed on a scale from "1--not at all" to "5--almost exclusively".

Source of Imagery

Subjects rated whether the imagined episode was a real event that had actually occurred in the past, or whether the event was completely fictitious or **mentally constructed** (1--recalled precisely an event that actually happened, 5--mentally constructed a new event).

Miscellaneous Measures

In addition to measures of emotional reactvity and strategies for involvement, as described above, the questionnaire included several other items of potential interest. Since subjects were required to imagine five episodes involving five different emotions, they were asked to rate the difficulty to **switch** from one emotion to another (1--not at all difficult, 5--extremely difficult).

The final two items on the questionnaire referred to a potentially confounding variable in research on emotionality with female subjects. Physiological reactivity and perhaps involvement in the kinds of emotionally relevant tasks in this study may vary as a function of a woman's **menstrual cycle** (Hastrup & Light, 1984). It is well known that many women experience mood swings shortly before their menstrual period. Thus, subjects were asked to indicate the phase of their

menstrual cycle at the time they participated in the laboratory session. A regular cycle was divided into four equal phases: menstrual and immediate postmenstrual phase, preovulatory phase, postovulatory phase, and premenstrual phase (see Appendix O). Another category was provided for subjects with undeterminable or irregular mentrual cycles. In addition, subjects were asked if they were currently using **oral contraceptives**, which interfere with the body's hormonal metabolism and thus can influence emotional reactivity.

At the end of the last trial, subjects' general autonomic reactivity was measured by taking a reading immediately before the blast of white noise and again shortly after, when skin conductance reached a peak level. An index of general reactivity was then obtained by subtracting the second reading (after blast) from the first reading (before blast). Comparable heart rate data could not be obtained due to the excessive artifacts in the record, resulting from the subjects' startle response.

Analyses (Phase II)

Repeated measures latin square ANOVAs (see Appendix H) were used to analyze the measures of emotional reactivity and strategies for involvement. Post-hoc comparisons among means were calculated using a Bonferroni t procedure to maintain the family-wise error rate at the .05 level.

Thus, in order for two means to be significantly different from each other they had to be rejected at an alpha level equal to .05 divided by the total number of comparisons performed on a dependent variable.

When referring to target emotions it should be remembered that these included fear, sadness, anger, and joy. They did not include tranquility, which was used as the initial practice trial. Tranquility is discussed only when it is essential for the understanding of the other results.

For several measures of emotional reactivity (intensity, heart rate, skin conductance, and respiration), ratings and recordings were obtained at each third of a trial (recall that each imagery trial was divided into three 40-second segments). Since the three time segments provided largely redundant information, mean ratings for the whole trial were calculated as a more stable and reliable measure. Thus, when referring to intensity or any of the three physiological measures in the following sections, the reader should be aware that they are mean ratings and recordings, unless otherwise indicated. The only section where this does not apply are the analyses concerned with the temporal effects of these variables, which take into consideration the three segments.

Dependent Variables (Phase III)

It will be recalled that during phase III of the study subjects recorded their everyday emotional experiences during the two weeks following the laboratory session. Subjects also obtained peer ratings from four acquaintances.

Average frequencies with which subjects experienced each emotion were computed by taking means over the 14-day period. The same procedure was used to compute mean ratings of the most intense episodes; the scale ranged from one to five ("1--not at all intense" to "5--extremely intense").

Peers rated the tendency of their friends to experience each emotion (i.e. their emotionality) on a scale from one to five (1--seldom, 5--often). Means were calculated by averaging ratings for each emotion over the number of peer reports that were received by the experimenter for each subject. The maximum number of peer reports per subject was four, the minimum was two with a median of four reports. Reliability estimates (Cronbach's alpha) were calculated from the mean correlation among the four peers for each of the 18 emotions. Reliabilities ranged from .11 for curiosity to .60 for anger, with a mean of .42 and a median of .35. Appendix Q lists the mean correlations and the reliability estimates for all 18 emotions. Reliabilities for the four target emotions were

as follows: fear (.28), sadness (.58), anger (.60), and joy (.21). The rating scales also listed eight questions on personality characteristics, five of which were concerned with role-taking ability (items A-E, Appendix J), two with emotional reactivity (F, H), and one with role-playing ability (G). Again, ratings were made on a scale from one to five (1--low, 5--high) and means over the number of peer reports per subject were computed. Because role-playing ability was the only item on the personality characteristics to be used for analysis, peer report reliability was assessed for that item only, which was .56.

Analyses (Phase III)

Subject and peer ratings of everyday emotional experiences were correlated with the various laboratory measures (emotional reactivity and strategies) and the personality inventories of phase I.

CHAPTER III

RESULTS

Analyses of Experimental Procedures

This section focuses exclusively on analyses of the laboratory measures (Phase II). It begins with methodological considerations that point to the redundancy of certain variables and potential confounding effects due to position and sequence in the latin square design. This is followed by a discussion of manipulation checks to determine whether the experimental procedures were successful. The main emphasis of this section are the condition effects (i.e. type of emotion) of the latin square analyses. They include measures of emotional reactivity, strategies for involvement, and physiological measures, and their correlations with each other. Finally, variables with temporal changes within trials are discussed.

Methodological Considerations

Correlations among Measures of Emotional Reactivity

Mean correlations among the self-report measures of emotional reactivity (ability, success, effort, intensity) were calculated by averaging the correlations over the four

target emotions, after all correlations were converted to z-scores. The results are presented in Table 1.

The high correlations among the four measures suggest that they share a great deal of common variance; therefore, unless indicated otherwise, subsequent discussion will be limited to the variables of success and intensity. These two variables were selected for presentation because intensity of involvement is basically redundant with self-reported ability to become involved ($r = .74$), but the former variable (intensity) was obtained for each third of a trial, and hence allows for a more detailed analysis. The success of involvement was retained because successful involvement in an imagery situation could include, in addition to an affective component, such factors as clarity and strength of the image, recall of specific actions and conversations, etc. Thus, it is possible for a person to become successfully involved in a low-intensity emotional experience.

Table 2 presents the correlations among the physiological measures and the self-report measures of emotional reactivity. Heart rate correlated moderately with skin conductance (.30, $p < .01$), and was negatively, though not significantly, related to respiration (-.19). Small nonsignificant correlations were also obtained for success and heart rate (.17) as well as success and respiration (-.16).

Table 1

Correlations among Self-Report Measures of Emotional Reactivity Averaged over Emotions, not Including Tranquility (N = 72)

	Ability	Success	Effort
Success	.68*		
Effort	-.46*	-.58*	
Intensity	.74*	.60*	-.36*

*$p < .001$. one-tailed.

Table 2

Correlations among Physiological Measures and Self-Report Measures of Emotional Reactivity Averaged over Emotions, not Including Tranquility (N = 72)

	Success	Intensity	Heart rate	Respiration
Heart rate	.17	-.02		
Respiration	-.16	-.08	-.19	
Skin conductance	0	-.08	.30*	-.03

*$p < .01$. two-tailed.

Position and Sequence Effects

When using a repeated measures latin square design, ideally, main effects for sequence and position ought to be non-existent. However, this is often not the case.

No significant sequence effects were found on any of the dependent variables. There were small but statistically significant position effects for the two self-report measures of emotional reactivity: **success**, $F(3, 204) = 2.79$, $p < .04$, and **intensity**, $F(3, 204) = 3.05$, $p < .03$. As is shown in Table 3, differences in position effects existed primarily between the first trial and the remaining three trials. Specifically, subjects reported greater success and intensity on later trials. Evidently, the initial tranquility trial (which was not part of the Latin Square design) was not entirely successful in establishing a stable baseline for these two variables.

However, considering the large numbers of degrees of freedom and the relatively small Fs for these analyses, the size of the position effects is rather trivial, even when statistically significant. Post-hoc multiple comparisons indicated significant differences between Trial 1 and Trial 4 for success; no significant comparisons among trials were obtained for mean intensity (see Table 3). (The apparently contradictory result between a significant overall F and non-significant post-hoc comparisons is possible because the overall F was rejected at $p < .05$ while the multiple

Table 3

Mean Ratings of Measures of Emotional Reactivity and Physiological Recordings within Trials

Measure of emotional reactivity	Position (Trial) 1	2	3	4
Success	3.61_{b}	3.85_{ab}	3.74_{ab}	3.97_{a}
Intensity	3.21_{a}	3.44_{a}	3.44_{a}	3.41_{a}
Skin conductance	$-.02_{a}$	$-.04_{a}$	$-.04_{a}$	$-.06_{a}$
Heart rate	1.97_{a}	2.44_{a}	1.96_{a}	2.87_{a}
Respiration	$.64_{a}$	$.44_{a}$	$.37_{a}$	$.61_{a}$

Note. Means having the same subscript are not significantly different at $p < .01$. Skin conductance, heart rate, and respiration were not significant on the overall F test.

comparisons, using a Bonferroni t, were rejected at $p < .01$.).

Manipulation Check

Self-Reported Affect

When subjects were asked to imagine a situation with a given target emotion, their subsequent ratings on the mood checklist were congruent with the corresponding target emotion; that is, subjects indeed felt in accordance with the emotion they were asked to experience. The results are shown in Table 4. It is also evident from Table 4 that the negative target emotions tended to be confounded with one another to a certain extent. For example, in the fear condition people rated themselves as sad and angry as well as fearful (see Table 4). Only joy was unconfounded by other emotions.

Condition Effects

Measures of Emotional Reactivity

Self-reports. Subjects' success in becoming involved in emotional imagery varied with the type of emotion they were asked to experience, $F(3, 204) = 11.43$, $p < .001$. As shown in Table 5, sad experiences received the highest mean ratings of successful involvement, followed by anger and joy. Fearful experiences received the lowest ratings of successful involvement. The results indicate that experiences of fear, sadness, anger, and joy were not

Table 4

Mean Ratings of Self-Reported Affects within Emotion Category

Self-reported affect[a]	Condition			
	Fear	Sadness	Anger	Joy
Fear	3.69	2.42	1.84	1.39
Sadness	2.23	4.22	2.16	1.09
Anger	2.04	2.04	4.20	1.03
Joy	1.05	1.03	1.05	4.02

[a] Each self-reported affect is the mean of four adjectives. For example, "Fear" is the mean rating on fearful, scared, jittery, and afraid.

Table 5

Mean Ratings of Measures of Emotional Reactivity and Physiological Recordings within Emotion Category

Measure of emotional reactivity	Condition			
	Fear	Sadness	Anger	Joy
Self-report				
Success	3.35_{b}	4.14_{a}	3.86_{a}	3.87_{a}
Intensity	3.13_{b}	3.55_{a}	3.38_{ab}	3.45_{ab}
Physiological				
Skin conductance	$-.04_{a}$	$-.04_{a}$	$-.03_{a}$	$-.06_{a}$
Heart rate	1.67_{a}	2.92_{a}	2.90_{a}	1.76_{a}
Respiration	1.29_{a}	$-.45_{c}$	$.80_{ab}$	$.42_{b}$

Note. Means having the same subscript are not significantly different at $p < .01$. Skin conductance and heart rate were not significant on the overall F test.

equally well imagined. However, post-hoc comparisons, as Table 5 indicates, showed only fear to differ signifcantly from the other emotions.

The **intensity** with which subjects experienced the imagery situations varied significantly with the type of emotion, $F(3, 204) = 7.26$, $p < .001$. Highest mean ratings were given to sadness, followed by joy and anger, lowest ratings were given to fear (see Table 5). The only post-hoc comparisons to reach significance were between fear and sadness.

In short, on the basis of these self-report measures, fear was the least involving, and sadness the most involving of the emotional conditions.

Physiological measures. None of the analyses performed on **skin conductance** yielded significant condition effects.

Mean **heart rate** levels during imagery were significantly higher than baseline rates for each of the four target emotions ($p < .01$).

Mean heart rate changes, however, were not statistically significant for the emotions ($F(3, 204) = 1.85$, $p < .14$). Yet the rank orders of the heart rate changes closely resembled the rank orders of the self-report ratings, particularly on the extremes (fear, 1.67 bpm and sadness, 2.92 bpm).

Mean **respiration** rates during imagery were also significantly different from baseline rates, but only for

three of the target emotions ($p < .03$). Respiration rate during sadness was only marginally significant ($p < .08$).

Mean respiration rate, measured in breathing cycles, was significantly different for the four emotions ($F(3, 201) = 10.19$, $p < .001$). Table 5 shows the mean change in respiration rates for each target emotion. A negative score indicates that the respiration rate was below the baseline level for that particular target emotion. Post-hoc comparisons among the means demonstrated significant differences between all possible pairs of emotions, except between fear and anger, and anger and joy (see Table 5). Again, rank orders were similar to those of the other measures of emotional reactivity, although in reverse order: sadness produced the smallest increase (or largest decrease) in breathing while fear produced the largest increase. The results might at first seem surprising when compared to the mean heart rate increases for the individual emotions cited above. Thus, the sadness condition was associated with the highest heart rate changes and the lowest respiration rates while the exact opposite occurred in the fear condition (see Table 5). But recall, there was a negative (within conditions) correlation between heart rate and respiration, which makes the above results quite consistent. A close examination of the physiological records did not indicate any abnormalities that could have explained the opposing patterns in heart rate and respiration; however, it is

known that a feedback loop does exist between the two, the results are therefore not unusual.

Summary

As a result of high intercorrelations among self-reported measures of emotional reactivity, two variables, success and intensity, were chosen for further analysis. Small position effects for success and intensity were obtained but did not confound the latin square design because of the small Fs obtained and the large number of degrees of freedom. The manipulation check indicated that the experimental procedures were successful in eliciting the desired emotions. Significant differences between target emotions were obtained for three measures of emotional reactivity: success, intensity, and respiration. The largest discrepancies occurred mostly between fear and sadness where fear produced the lowest ratings and sadness the highest ratings. The reverse was true for respiration.

Strategies for Emotional Involvement

Correlations among strategies for emotional involvement. Combined correlations for strategies for emotional involvement were calculated by averaging over the four target emotions after all correlations were converted to z-scores. The results are presented in Table 6. Not surprisingly, a strong negative relationship was obtained between participant and observer orientation (-.60). That

Table 6

Correlations among Strategies of Emotional Involvement Averaged over Emotions, not Including Tranquility (N = 72)

	1	2	3	4	5
Mode of imagery					
1. Visual					
2. Verbal	-.11				
3. Motor	-.03	.28*			
Orientation of imagery					
4. Observer	-.06	.14	.08		
5. Participant	.17	-.01	.07	-.60**	
Source of imagery					
6. Mental Construction	-.05	0	-.08	-.02	-.03

*$p < .05$. **$p < .001$. two-tailed.

is, the more a subject used one strategy, the less she used the other. A moderate, but significant, positive relationship also was found between the verbal and motor mode of imagery induction (.28).

Mode of imagery. Subjects' use of each modality varied significantly as a function of the type of emotion experienced: **visual** strategy, $F(3, 204) = 8.05$, $p < .001$; **verbal** strategy, $F(3, 204) = 19.06$, $p < .001$; and **motor** strategy, $F(3, 204) = 6.91$, $p < .001$. Table 7 shows the distribution of means for the target emotions. The visual strategy was used most often in the joy condition; the other conditions did not differ significantly among themselves. On the other hand, both verbal and motor strategies were used significantly more often in the angry than in any of the other situations; the verbal mode was used significantly less often in the fear condition than in any other condition.

Orientation of imagery. Main effects of the emotions were significant for both the **observer** mode ($F(3, 204) = 10.69$, $p < .001$) and the **participant** mode ($F(3, 204) = 5.22$, $p < .002$). Subjects were more likely to act as observers in the sadness and fear conditions than they were in the joy or anger condition (see Table 7). Conversely, individuals saw themselves more as participants in the anger and joy condition than in the sadness or fear condition (see Table 7 for specific comparisons).

Table 7

Mean Ratings of Strategies for Emotional Involvement within Emotion Category

Strategy for emotional involvement	Emotion			
	Fear	Sadness	Anger	Joy
Mode of imagery				
Visual	4.22_{b}	4.32_{b}	4.10_{b}	4.67_{a}
Verbal	2.86_{c}	3.48_{b}	4.04_{a}	3.54_{b}
Motor	2.49_{b}	2.78_{b}	3.18_{a}	2.77_{b}
Orientation of imagery				
Observer	3.01_{ab}	3.41_{a}	2.61_{bc}	2.59_{c}
Participant	3.55_{b}	3.61_{b}	4.08_{a}	4.07_{a}
Source of imagery				
Recall vs. mental construction	3.58_{a}	2.69_{b}	2.00_{c}	2.85_{b}

Note. Means having the same subscript are not significantly different at $p < .01$.

Evidently anger and joy are more easily experienced through active engagement than passive observation.

Source of imagery. The degree to which subjects mentally constructed an event as compared to recalling an actual event also varied significantly with the type of emotion, $F(3, 204) = 12.31$, $p < .001$. Fearful situations were more mentally constructed than any of the other emotional situations (see Table 7); angry situations, on the other hand, were predominantly actual events recalled by the subjects.

Mean Ratings of Self-Report Measures across Target Emotions

Table 8 shows the mean ratings of the self-reported strategies for emotional involvement as averaged over the four target emotions, and their respective standard deviations. As the table indicates, means among the three modes of imagery varied substantially as did the means among the orientations of imagery. Although most subjects used all these measures to varying degrees in each emotional episode, subjects relied primarily on the visual strategy and a participant mode of interaction with the imagined situations. Motor strategy and observer mode, on the other hand, were least used to become involved in emotional imagery. Post-hoc comparisons between the most and least used strategies were found to be significant (see Table 8).

Table 8

Mean Ratings (on a 5-Point Scale) of Self-Reported Strategies for Emotional Involvement Averaged over Emotions, not Including Tranquility

	M	SD
Mode of imagery		
Visual	4.32_a	.65
Verbal	3.48_b	1.08
Motor	2.81_c	1.16
Orientation of imagery		
Observer	2.91_b	1.07
Participant	3.81_a	.87

Note. Means having the same subscript within the grouped self-report measures are not significantly different on t-tests at $p < .001$.

Correlations among Measures of Emotional Reactivity and Strategies for Emotional Involvement

Table 9 presents the correlations between the measures of emotional reactivity and the strategies for emotional involvement. It is notable that, although as Table 7 indicated, subjects' use of the motor strategy was less frequent than the use of the visual and verbal strategies (recall that subjects were instructed to remain still during the imagery trials), motor strategy nevertheless correlated highest with the success and intensity of involvement in the emotional situations.

Subjects also were more successful in becoming involved in the emotional situations when they imagined actual events as opposed to mentally constructed events.

Finally, success and intensity of involvement tended to be more associated with participation in the imagined situations rather than observing them.

Temporal Effects

For self-reported intensity, skin conductance, heart rate, and respiration, ratings and recordings were obtained at each third of a trial. Temporal effects of each measure were analyzed by a 2 X 3 X 4 analysis of variance with time segment as a repeated factor. Interaction effects due to conditions or role-playing ability were not significant on any of these measures, thus any temporal (within trial) effects were not influenced by the emotions.

Table 9

Correlations between Measures of Emotional Reactivity and Strategies for Emotional Involvement for Emotions (N = 72)

	Success	Intensity	Heart rate	Resp.
Fear				
Visual	.24*	.22	.10	.08
Verbal	.11	.04	-.09	-.02
Motor	.28*	.22	.08	.03
Mental Construct.	-.20	-.20	.09	-.13
Observer	-.11	-.01	-.21	-.10
Participant	.36**	.22	.27*	.08
Sadness				
Visual	.22	.09	.02	-.09
Verbal	.26*	.14	.02	.05
Motor	.35**	.46***	.16	-.12
Mental Construct.	-.37***	-.18	-.01	.20
Observer	-.16	.04	.09	-.10
Participant	.34**	.08	-.04	.13
Anger				
Visual	.25*	.22	.06	.04
Verbal	.23*	.14	-.03	.03
Motor	.45***	.32**	.29**	-.25*
Mental Construct.	-.26*	-.07	-.03	.01
Observer	-.01	-.13	.16	-.11
Participant	.11	0	-.19	.19
Joy				
Visual	.28*	.28*	-.02	.11
Verbal	.30**	.21	-.05	.09
Motor	.32**	.32**	.08	-.22
Mental Construct.	-.07	.05	-.10	-.02
Observer	-.07	-.15	.05	.04
Participant	.39***	.39***	.17	-.17

*p < .05. **p < .01. ***p < .001. two-tailed.

Intensity ratings during the imagery trials were significantly different for the three time segments, $F(2, 69) = 4.30$, $p < .02$. As Table 10 shows, self-reported intensity of the emotional experiences was lowest during the first segment, then rose to its highest levels during the second segment, only to drop again during the last segment. Post-hoc comparisons were only significant between the first and the second third of the trials.

A highly significant segment main effect was obtained for skin conductance, $F(2, 66) = 116.06$, $p < .001$. Skin conductance levels decreased steadily over the three segments of the trials (see Table 10). Post-hoc contrasts indicated that each segment was significantly different from the other segments.

Segment main effects were also obtained for heart rate and respiration, $F(2, 68) = 5.23$, $p < .008$ and $F(2, 68) = 9.39$, $p < .001$ respectively. Table 10 indicates that heart rate increases were most dramatic during the first segment and then decreased consistently during the following two segments. Post-hoc comparisons were significant between the first and the second segment and also between the first and the third segment. Respiration rates, on the other hand, produced a reversed pattern (see Table 10). Changes in respiration from baseline levels were smallest during the first segment, but subsequently increased with the greatest changes occurring in the third segment. Significant post-hoc comparisons were again found between

Table 10

Mean Ratings (across Target Emotions) of Measures of Emotional Reactivity within Segments

Measure of emotional reactivity	Segment		
	First third	Second third	Last third
Self-report			
Intensity	3.25_{b}	3.49_{a}	3.39_{ab}
Physiological			
Skin conductance	$.02_{a}$	$-.04_{b}$	$-.10_{c}$
Heart rate	2.84_{a}	2.23_{b}	1.99_{b}
Respiration	$.25_{b}$	$.63_{a}$	$.66_{a}$

Note. Means having the same subscript are not significantly different at $p < .02$.

the first and the second third as well as the first and the last third of the trials.

It was surprising to find no consistent temporal effects among the four measures of arousal. Each measure peaked during a different segment: heart rate and skin conductance on the first segment, intensity on the second segment, and respiration on the third segment.

Miscellaneous Measures

Repeated measures analysis of variance on subjects' ability to switch from one emotion to another did not yield significant results. Analyses on differences in emotional reactivity as a function of a woman's menstrual cycle were also not significant.

Heart rate data recorded from subjects' startle response to the blast of white noise were unanalyzable because of extraneous artifacts. Skin conductance did not yield significant results, there was thus no need to correct for individual autonomic reactivity.

Summary

Correlations among strategies for emotional involvement indicated that orientations of imagery were to a large extent mutually exclusive; that is, subjects used either a participant or an observer orientation but not both during an imagery situation. When subjects used a

verbal mode during imagery they frequently used a motor mode at the same time.

Latin square analyses of variance of the strategies showed that each strategy was more successful with one emotion than another: visual mode was most used with joy, verbal and motor mode were most often used with anger, an observer orienation was best with fear and sadness while a participant orientation was favored with anger and joy. Fearful situations were primarily mentally constructed; angry situations, on the other hand, were most often actual past events.

In general, visual and participant strategies were the most frequently used strategies to become involved in emotional events. However, despite the low use of the motor mode, it nevertheless correlated higher with success and intensity of the imagined situations than the visual and verbal mode.

Significant temporal effects of measures of emotional reactivity were always found between the first and the second third of an imagery trial.

Relationship of Reactivity and Strategies in the Laboratory to Self-Reported and Peer-Reported Emotional Experience

Results in this section concentrate primarily on correlational analyses between laboratory measures and emotional reactivity in daily life as rated by subjects and their peers. In particular, correlations are presented between laboratory measures and subjects' frequency and intensity in everyday life of the four corresponding target emotions (fear, sadness, anger, joy) together with their peer ratings. Correlations are also presented between laboratory measures and subjects' overall emotionality in everyday life. Finally, correlations between subjects' frequency and intensity ratings and peer emotionality ratings are given for all 18 emotions (recall rating scale of Phase III).

Correlations between Laboratory Measures and Subjects' Take-Home Ratings and Peer Ratings

Subjects' daily self-reported frequency and intensity of emotional experiences, averaged over the 14-day period, together with their respective standard deviations are listed in Appendix R. Subjects' frequency ratings were found to be highly positively skewed, median ratings were therefore calculated as a more accurate reflection of their daily emotional experiences (see Table 14). Peer

emotionality ratings on each of the 18 emotions are also included in Appendix R.

For statistical purposes, daily frequencies were transformed to logarithms and then averaged. The log transformation was chosen to normalize the skewed distributions of the subjects' frequency ratings. The transformation was successful in that it eliminated or greatly reduced the skewness of the frequency ratings on the 18 emotions. As a result, all subsequent analyses were performed using the transformed frequency ratings.

Pearson correlations were calculated between the laboratory measures and the subjects' take-home ratings and the peer ratings. Table 11 shows the correlations of the laboratory measures within each target emotion and the corresponding ratings on the same emotions on the subject and peer rating scales. It is apparent from this table that there are no clear consistencies or discrepancies across the four target emotions. Most notably, however, it seems that subjects' intensity ratings in the laboratory were more related to the frequency (mean r over four emotions = .16) than the intensity (mean r = .03) with which they experienced the same emotions in everyday life. Among strategies for emotional involvement visual and motor strategies, too, tended to be more highly correlated with subjects' frequency of everyday emotions (visual, .17 vs. .01 for intensity; motor, .17 vs. .08), while the use of verbal strategies was associated with lower intensity of

Table 11

Correlations between Laboratory Measures and Subjects' Ratings and Peer Ratings within Respective Emotion Categories (N = 72)

Laboratory measure	Subject ratings		Peer ratings
	Frequency	Intensity	Emotionality
Fear			
Reactivity (Self-report)			
Success	.05	.05	0
Intensity	.11	.01	.10
Reactivity (Physiological)			
Heart rate	-.03	0	.13
Skin conductance	.16	-.02	-.05
Respiration	.05	-.13	.08
Strategy			
Visual	.30**	-.01	.10
Verbal	-.13	-.21	-.10
Motor	.12	.06	.11
Observer	-.11	.10	-.09
Participant	.16	-.07	.04
Mental Construct.	-.01	.02	-.13
Sadness			
Reactivity (Self-report)			
Success	.06	-.15	-.04
Intensity	.20	.06	.07
Reactivity (Physiological)			
Heart rate	.01	.04	-.03
Skin conductance	.08	-.08	.06
Respiration	-.16	-.10	-.04
Strategy			
Visual	.08	.17	-.03
Verbal	-.09	-.25*	-.14
Motor	.20	.10	-.03
Observer	.07	.05	-.11
Participant	-.06	-.02	.02
Mental Construct.	-.18	.10	.09

continued next page

Table 11 cont´d

Laboratory measure	Subject ratings		Peer ratings
	Frequency	Intensity	Emotionality
Anger			
Reactivity (Self-report)			
Success	.08	.04	.08
Intensity	.21	0	.29**
Reactivity (Physiological)			
Heart rate	-.01	-.04	-.02
Skin conductance	.28*	.16	.05
Respiration	.07	-.18	.20
Strategy			
Visual	.24*	-.09	.11
Verbal	0	-.13	-.07
Motor	.17	.10	-.07
Observer	-.11	0	-.03
Participant	.20	.03	.03
Mental Construct.	.17	.21	-.15
Joy			
Reactivity (Self-report)			
Success	-.02	-.05	.12
Intensity	.12	.04	-.01
Reactivity (Physiological)			
Heart rate	.16	-.09	.01
Skin conductance	.27*	.20	.12
Respiration	.02	-.28*	-.09
Strategy			
Visual	.04	-.03	-.09
Verbal	.05	-.06	.08
Motor	.20	.04	-.14
Observer	.14	-.12	.08
Participant	-.02	.01	-.09
Mental Construct.	.01	-.07	-.22

*p < .05. **p < .01. two-tailed.

the everyday experiences of the target emotions (-.16 vs. -.04 for frequency). The relationship between physiological measures and self- and peer-reported emotional experience was most pronounced for the only positive emotion, joy.

A measure of general everyday emotional experience was computed by taking means across the 18 emotions on subjects' frequency and intensity ratings as well as peer ratings. These were correlated with the mean ratings taken over the four target emotions on the laboratory measures, including the physiological measures (see Table 12). As Table 12 indicates, the success, and, again as in the case of the matched emotions, the intensity with which emotions were experienced in the laboratory tended to be more related to subjects' frequency of general emotionality. Among strategies, there was a moderate relationship between subjects' frequency of everyday emotional experiences and the use of visual and motor strategies during emotional imagery. Furthermore, there was a consistent, although not significant, negative relationship across the three ratings (subject and peer) for the verbal strategy and the observer mode, while a consistent positive relationship was shown for the participant mode. Among the physiological measures, skin conductance in the laboratory was the only one to correlate significantly with subjects' frequency ratings.

Table 12

Correlations between Laboratory Measures and Subjects' Ratings and Peer Ratings Averaged over all Emotions (N = 72)

Laboratory measure	Subject ratings		Peer ratings
	Frequency	Intensity	Emotionality
Reactivity (Self-report)			
Success	.13	-.04	.07
Intensity	.17	.03	.14
Reactivity (Physiological)			
Heart rate	.06	-.02	.04
Skin conductance	.26*	.03	.23*
Respiration	.08	-.11	-.10
Strategy			
Visual	.25*	.09	.12
Verbal	-.02	-.20	-.19
Motor	.22	.12	-.05
Observer	-.03	-.10	-.12
Participant	.12	.11	.18
Mental Construction	.08	.12	-.04

*$p < .05$. two-tailed.

Correlations between Self-Reported and Peer-Reported Emotional Experience

Table 13 lists the correlations between peer ratings and subjects' frequency and intensity ratings on corresponding emotions. Peer emotionality ratings correlated positively throughout the 18 emotions with subject intensity while several negative correlations were obtained with frequency ratings. Except for boredom, all negative correlations involved positive emotions (affection, curiosity, joy, and hope).

Several statistically significant correlations of peer ratings were obtained with both subjects' frequency and intensity ratings. Interestingly, however, correlations of peer ratings with subject frequency involved (except for surprise) only negative emotions (anger, shame) while correlations with subject intensity involved mostly positive emotions (amusement, joy, pride).

Table 14 shows subjects' mean and median frequency ratings as well as mean intensity ratings for the 18 emotions and the correlations between them. As was expected, positive emotions were experienced more frequently than negative emotions. The correlations between subjects' frequency of emotions and their intensity ratings were all positive, except for humility; several of the correlations were significant (amusement, hope, sadness). The more often an emotion is experienced, the more intense some episodes are likely to be.

Table 13

Correlations of Peer Ratings with Subjects' Frequency and Intensity Ratings on Individual Emotions (N = 72)

Emotion	Correlation of peer ratings with Subject Frequency	Subject Intensity
Amusement	.22	.40***
Boredom	-.02	.21
Fear	.18	.01
Sadness	.20	.18
Affection	-.04	.18
Humility	.19	.01
Surprise	.25*	.10
Curiosity	-.14	.03
Sympathy	.03	.09
Shame	.29**	.01
Pride	.17	.27*
Joy	-.01	.32**
Daring	.13	.01
Hope	-.02	.09
Contempt	.18	.01
Sentimental	.10	.06
Anger	.29**	.08
Disgust	.20	.10
Emotions (M)	.12	.12

*$p < .05$. **$p < .01$. ***$p < .001$. one-tailed.

Table 14

Mean Ratings, Median Ratings, and Correlations of Subjects' Frequency with Subjects' Intensity on Individual Emotions (N = 72)

Emotion	Subject Frequency		Subject Intensity	
	Mean	(Median)	Mean	r[a]
Amusement	5.83	(4.29)	3.88	.43***
Affection	3.86	(3.07)	3.90	.07
Hope	3.30	(2.21)	3.95	.43***
Joy	3.22	(2.50)	3.90	.05
Sentimental	2.67	(2.07)	3.78	.21
Boredom	2.38	(1.93)	3.57	.07
Sympathy	2.37	(2.00)	3.59	.11
Sadness	1.99	(1.29)	3.42	.39***
Pride	1.87	(1.50)	3.48	.22
Curiosity	1.87	(1.36)	3.40	.17
Anger	1.48	(1.07)	3.54	.20
Contempt	1.40	(.93)	3.31	.07
Surprise	1.36	(1.07)	3.52	.03
Shame	1.33	(.93)	3.34	.18
Humility	1.23	(.79)	3.08	-.22
Daring	1.21	(.71)	3.33	.06
Disgust	1.13	(.83)	3.29	.06
Fear	1.07	(.71)	3.15	.05
Emotions (M)	2.20	(1.63)	3.52	.15

*p < .05. **p < .01. ***p < .001. two-tailed.

[a] correlations were calculated on mean log frequencies.

Summary

Subjects' intensity of the target emotions in the laboratory was more related to the frequency than the intensity of the same emotions in everyday life. Among strategies, visual and motor modes during imagery correlated higher and positively with frequency while the verbal mode correlated higher but negatively with intensity. These results were consistent for correlations of laboratory measures with mean ratings taken over all 18 emotions.

Emotionality in everyday life, as rated by subjects and peers, correlated positively with skin conductance in the laboratory. Furthermore, emotionality was generally related positively to a participant and negatively to an observer orientation of imagery in the laboratory.

Correlations between peer ratings and subjects' frequency ratings were significant for several emotions, most of them negative. Significant correlations between peer ratings and subjects' intensity ratings were obtained for mostly positive emotions.

Several correlations between subjects' frequency and intensity were significant. Except for one, all correlations were positive.

Relationship of Personality to Laboratory Measures and Everyday Emotional Experience

The following section presents statistical analyses of subjects' personality inventories in conjunction with laboratory measures and take-home ratings of emotionality. Means and t-tests are provided for both the total sample of subjects consisting of males and females and the laboratory sample consisting of only female subjects. Results of latin square analyses of variance on role-playing ability are given for the laboratory sample.

The majority of the analyses in this section are correlational: correlations between role-playing ability and other personality inventories, correlations between personality inventories and laboratory measures as well as self-reported and peer-reported emotional experience in everyday life. Finally, correlations are given for peer ratings of role-playing ability and self-reported and peer-reported emotional experience.

Personality Inventories

The total sample of students who participated in phase I was analyzed separately for males and females. Table 15 presents the means and standard deviations for both sexes on the personality inventories. The table also shows that t-test comparisons between males and females were statistically significant for all personality variables,

Table 15

Means, Standard Deviations, and Comparisons among Means of Personality Inventories for Males (N = 215) and Females (N = 390) in Phase I

Personality inventory	Males		Females			
	M	*SD*	*M*	*SD*	*t*	*p*
Extraversion	14.87	3.61	15.57	3.47	2.31	.02
Neuroticism	12.63	3.78	13.85	3.95	3.66	.001
Lie scale	1.20	1.25	1.54	1.30	3.12	.002
IDQ (verbal)	24.81	7.33	25.15	7.99	.52	.61
IDQ (visual)	30.22	5.18	31.27	4.84	2.49	.01
Role-playing	80.14	13.33	80.38	14.89	.20	.84
Affect intensity	3.68	.40	4.00	.44	8.80	.001

Note. Due to missing data, n for males ranged from 210 to 215, n for females ranged from 381 to 389.

except verbal thinking style and role-playing ability. One question of interest was whether high and low role-players also differed on other personality characteristics. A median split on role-playing ability was performed for male and female subjects in phase I (Md = 79 for both sexes). As Table 16 indicates, high and low role-players differed significantly on all but two personality variables. The nonsignificant comparisons were related to affect intensity and lying in the male sample. When the female sample who participated in the laboratory session was analyzed, t-test comparisons remained significant for the two role-playing groups, except for the lie scale (see Table 17).

Correlations between Role-Playing Ability and Personality Inventories

Table 18 presents correlations between subjects' role-playing ability and the other personality inventories calculated for males and females in phase I as well as the group of females who participated in phase II of the study (correlations among all personality inventories are listed in Appendix S). As is shown for subjects in the laboratory session, role-playing ability correlated moderately well with all personality inventories, except the lie scale. The correlations with extraversion, neuroticism, and affect intensity suggest that individuals with good role-playing ability also tend to be more extraverted and emotional.

Table 16

Means, Standard Deviations, and Comparisons among Means of Personality Inventories for Males (N = 215) and Females (N = 390) in Phase I, Separated by Role-Playing Ability

Personality inventory	Role-playing ability: Low M	Low SD	High M	High SD	t	p
Males						
Extraversion	14.27	3.63	15.41	3.44	2.32	.02
Neuroticism	11.95	3.67	13.28	3.79	2.56	.01
Lie scale	1.19	1.27	1.20	1.24	.03	.97
IDQ (verbal)	23.53	6.77	26.24	7.71	2.68	.01
IDQ (visual)	28.72	5.17	31.56	4.88	4.06	.001
Affect intensity	3.64	.40	3.72	.39	1.44	.15
Females						
Extraversion	14.48	3.45	16.51	3.26	5.83	.001
Neuroticism	13.34	3.95	14.37	3.86	2.56	.01
Lie scale	1.73	1.38	1.40	1.24	2.38	.02
IDQ (verbal)	22.49	7.66	27.79	7.45	6.77	.001
IDQ (visual)	29.48	5.08	32.92	4.04	7.25	.001
Affect intensity	3.92	.47	4.06	.39	3.08	.002

Note. Due to missing data, n for males ranged from 98 to 103, n for females ranged from 178 to 183 in the low role-playing group; n for males ranged from 102 to 105, n for females ranged from 187 to 191 in the high role-playing group.

Table 17

Means, Standard Deviations, and Comparisons among Means of Personality Inventories for Females in Phase II, Separated into Low (n = 32) and High (n = 40) Role-Playing Ability

Personality inventory	Role-playing ability					
	Low		High			
	M	SD	M	SD	t	p
Extraversion	14.53	3.96	17.05	3.05	3.05	.003
Neuroticism	13.00	4.52	15.38	3.88	2.40	.02
Lie scale	1.50	1.19	1.48	1.63	.07	.94
IDQ (verbal)	23.00	8.85	28.80	7.62	2.99	.004
IDQ (visual)	29.56	3.93	33.63	3.71	4.50	.001
Affect intensity	3.82	.49	4.05	.40	2.26	.03
Mental Imagery[a]	2.76	.72	2.22	.60	3.50	.001

[a] low score means good mental imagery ability

Table 18

Correlations between Role-Playing Ability and Personality Inventories for Males (N = 205) and Females (N = 373) in Phase I and Females in Phase II (N = 72)

	Role-playing ability			
	Self-reported (RP Scale)			Peer rating
Personality inventory	Phase I Males	Phase I Females	Phase II Females	Phase II Females
Extraversion	.15*	.31***	.37***	.32**
Neuroticism	.21**	.18***	.31**	.09
Lie scale	-.05	-.08	-.01	.01
IDQ (verbal)	.23**	.35***	.30**	.22
IDQ (visual)	.39***	.37***	.50***	.05
Affect intensity	.25**	.21***	.25*	.11
Mental imagery[a]			-.37***	-.39***
Role-playing (RP Scale)				.53***

*$p < .05$. **$p < .01$. ***$p < .001$. two-tailed.
[a] low score means good mental imagery ability

The significant correlations obtained for visual and verbal thinking habits, and mental imagery ability (items were reverse scored) were not surprising since many of the items on the role-playing scale deal with imagery, fantasy, story telling, or play acting. It is plausible that these activities require a good deal of visual thinking and imagery ability.

The peer rating scales included several questions pertaining to personality characteristics of the subjects. One of the question was particularly relevant to the study: "Would she (the subject) make a good actor (for example, if asked to play the part of a "hillbilly", or of a tightrope walker with hiccups, could she do so convincingly)?" The question evaluates subjects' role-playing ability. Table 18 shows the correlations of the peer rating of role-playing with subjects' personality inventories. When peers judged subjects to be good actors subjects were indeed high on role-playing ability. Good actors (as rated by peers) were also more extraverted, had good imagery ability, and adopted a verbal thinking style.

Role-Playing Effects

Role-Playing Ability

Latin square analyses of variance did not demonstrate any main effects or interaction effects for role-playing ability on any of the self-report measures, nor on skin conductance. However, there were significant main effects

on both heart rate and respiration as a function of role playing ability.

Significant differences in heart rate increases from baseline levels were obtained for role-playing ability, $F(1, 64) = 8.13$, $p < .006$. Good role-players showed an average increase of 3.42 bpm when imaging emotional situations, while poor role-players had an average increase of only .93 bpm. This indicates that emotional imagery was physiologically more arousing for subjects with high role-playing ability than for subjects with low role-playing ability.

Respiration during imagery showed significant differences in breathing cycles (bc) between the two role-playing groups, $F(1, 63) = 4.00$, $p < .05$. Respiration increased by .25 bc for good role-players, whereas it rose by .86 bc for poor role players. In short, good role-players had higher heart rates and lower respiration rates during imagery than poor role-players for whom this was exactly the opposite.

Baseline levels for both heart rate and respiration where not significantly different for the two role-playing groups. Hence, the above reported results are specific to the influence of role-playing on emotional reactivity.

Correlations between Personality Inventories and Laboratory Measures

Correlations between self-report measures and physiological recordings in the lab and personality scales were calculated for each target emotion. After converting the correlations to z-scores and averaging over the four emotions, mean correlations were obtained and are listed in Table 19. Although the total number of significant correlations was approximately at the level that one would expect by chance alone, there were several interesting trends. The three measures of emotionality (neuroticism, role-playing, and affect intensity) correlated positively with the motor strategy, though only neuroticism was significant. Subjects who scored high on the verbal scale of the IDQ tended to use more verbal strategies during imagery, while subjects high on the visual scale favored more visual strategies. It should be noted, however, that the scales are not mutually exclusive. Success and intensity of emotional imagery tended to be more associated with extraversion. This was also true for the visual and verbal strategies and the participant mode. Good mental imagery skills were positively related to all self-report measures, except observer mode (recall that items on the imagery scale were reverse scored). Correlations of personality inventories with heart rate were mostly positive while the correlations with respiration were

Table 19

Correlations between Personality Inventories and Mean Laboratory Measures for Females in Phase II (N = 72)

Personality inventory	Laboratory measure			
	Success	Intensity	Visual	Verbal
Extraversion	.15	.13	.12	.11
Neuroticism	-.01	.03	.08	-.11
IDQ (verbal)	.09	.07	.04	.18
IDQ (visual)	.08	.10	.21	-.02
Role-playing	.07	.12	.06	.04
Affect intensity	.02	.06	-.03	.09
Mental imagery[a]	-.12	-.13	-.04	-.16
Make good actor[b]	0	.03	-.10	.07

	Motor	Ment. Con.	Observer	Participant
Extraversion	-.04	.03	-.09	.12
Neuroticism	.26*	-.05	-.16	.12
IDQ (verbal)	.07	.15	-.01	.04
IDQ (visual)	-.01	-.03	.03	.07
Role-playing	.20	.08	.07	-.02
Affect intensity	.15	0	-.11	.09
Mental imagery[a]	-.08	-.17	.06	-.15
Make good actor[b]	.12	.12	.03	.03

	Heart rate	Respiration	Skin Cond.
Extraversion	.06	-.16	.06
Neuroticism	.05	-.01	-.15
IDQ (verbal)	.14	-.01	.08
IDQ (visual)	.16	-.05	.11
Role-playing	.27*	-.14	.06
Affect intensity	-.04	-.10	-.09
Mental imagery[a]	-.10	.09	-.11
Make good actor[b]	.18	-.16	.13

*$p < .05$. **$p < .01$. two-tailed.

[a] low score means good mental imagery ability

[b] peer rating of subjects' role-playing ability

mostly negative. Only role-playing and heart rate showed a significant relationship (see Table 19).

None of the correlations between peer ratings of role-playing ability and the laboratory measures were significant. Yet, several correlations were of approximately the same magnitude as those between subjects' self-ratings of role-playing ability and laboratory measures, amomg them heart rate, respiration, motor mode, and mental construction.

Correlations between Personality Inventories and Self-Reported and Peer-Reported Emotional Experience

Table 20 presents the correlations between personality inventories and subjects' log frequency of individual emotions over the 14-day period. It can be seen that subjects who scored high on the neuroticism scale reported a greater frequency of negative emotions. Moreover, all of the negative emotions correlated negatively with both the visual and verbal scales of the Individual Differences Questionnaire. At the same time, most of the positive emotions correlated positively with the visual and verbal scales. However, the majority of the correlations were not significant.

When personality inventories were correlated with subjects' intensity ratings on the individual emotions, the most striking result was the consistent negative relationship between mental imagery and all emotions,

Table 20

Correlations between Personality Inventories and Subject Log Frequency Ratings of Emotions (N = 72)

Subject frequency	Personality inventory			
	EI	N	IDQ (ver.)	IDQ (vis.)
Amusement	0	-.13	.20	.10
Boredom	-.06	.21	-.08	-.10
Fear	-.08	.23*	-.21	-.11
Sadness	0	.23*	-.24*	-.04
Affection	.01	-.03	.22	.09
Humility	.04	.20	-.03	-.04
Surprise	.02	.16	-.10	-.06
Curiosity	.10	.15	.01	.18
Sympathy	-.16	-.01	.01	-.01
Shame	-.07	.29**	-.13	-.03
Pride	.04	-.02	.03	.05
Joy	.03	-.02	.08	.10
Daring	.09	.29**	-.08	-.01
Hope	-.07	.14	-.01	-.03
Contempt	.02	.25*	-.11	-.07
Sentimental	-.01	.07	.01	.04
Anger	.10	.26*	-.08	-.01
Disgust	.04	.29**	-.08	-.13

	RPA	AIM	Betts[a]
Amusement	-.07	-.01	-.09
Boredom	-.13	.03	.23*
Fear	-.06	.05	.24*
Sadness	-.10	.08	.15
Affection	.09	.08	-.12
Humility	.03	.11	.07
Surprise	-.10	.01	.25*
Curiosity	.09	.06	-.03
Sympathy	-.05	-.07	.05
Shame	.09	.01	.10
Pride	-.06	.02	.09
Joy	-.13	.02	.08
Daring	.06	.12	.16
Hope	-.16	.10	-.02
Contempt	.02	.07	.15
Sentimental	-.04	-.04	.12
Anger	.05	.21	.11
Disgust	-.05	.14	.14

*$p < .05$. **$p < .01$. two-tailed.
[a] low score means good mental imagery ability

whether positive or negative (see Table 21). Thus, subjects with good mental imagery skills experienced all of the emotions more intensely. Again, however, not all correlations were significant.

In Table 22 correlations are shown between personality inventories and peer ratings of subjects' emotionality. Subjects who were more neurotic (emotional) were perceived by their peers to experience negative emotions more often than positive emotions. Peers also judged subjects who were extraverted to experience positive emotions more frequently, the correlations of which were all significant. Finally, the majority of the negative correlations between mental imagery and peer ratings were for positive emotions, indicating that subjects with good mental imagery abilities were seen by their peers to experience these more frequently.

Correlations between personality inventories and subjects' emotionality in general were obtained by averaging subject and peer ratings over the 18 emotions. Table 23 lists the correlations for subjects' mean frequency and intensity ratings and peer mean ratings on emotionality. Subjects' intensity ratings were significantly correlated with mental imagery ability. The more intensely subjects experienced the 18 emotions in everyday life, the more proficient they were in imagery ability. Subjects' frequency of emotions was positively, yet not significantly, correlated with neuroticism while

Table 21

Correlations between Personality Inventories and Subject Intensity Ratings of Emotions (N = 72)

Subject intensity	Personality inventory			
	EI	N	IDQ (ver.)	IDQ (vis.)
Amusement	.20	-.27*	.20	.21
Boredom	.06	.11	-.08	-.07
Fear	.04	-.01	-.08	-.06
Sadness	-.05	.10	-.24*	-.06
Affection	.23*	-.07	.03	.08
Humility	.14	0	.08	-.04
Surprise	.12	-.12	.08	-.03
Curiosity	0	-.02	-.04	.01
Sympathy	.11	-.15	.11	.24*
Shame	.02	.08	.05	.03
Pride	.11	-.11	0	.10
Joy	.19	-.01	.02	.15
Daring	0	-.07	.06	.02
Hope	.15	.09	-.04	.08
Contempt	.10	-.06	.04	-.08
Sentimental	.05	.13	-.09	.21
Anger	.07	.02	-.17	.08
Disgust	.15	-.02	.08	-.04

	RPA	AIM	Betts[a]
Amusement	.03	-.13	-.17
Boredom	-.04	-.05	-.10
Fear	0	.02	-.12
Sadness	-.07	.07	-.11
Affection	.06	-.05	-.24*
Humility	.08	.11	-.27*
Surprise	.02	0	-.28*
Curiosity	.11	-.01	-.15
Sympathy	.12	-.09	-.41***
Shame	.17	.14	-.30**
Pride	-.06	-.01	-.08
Joy	.10	.16	-.30**
Daring	.07	-.02	-.20
Hope	-.05	.18	-.26*
Contempt	-.12	.02	-.28*
Sentimental	-.05	-.04	-.12
Anger	.04	.18	-.16
Disgust	.05	.11	-.26*

*$p < .05$. **$p < .01$. ***$p < .001$. two-tailed.
[a] low score means good mental imagery ability

Table 22

Correlations between Personality Inventories and Peer Ratings of Emotions (N = 72)

Peer ratings	Personality inventory			
	EI	N	IDQ (ver.)	IDQ (vis.)
Amusement	.29**	-.16	.19	.04
Boredom	-.15	.11	.04	-.05
Fear	-.12	.21	-.22	.11
Sadness	-.15	.22	-.14	-.08
Affection	.15	-.17	-.12	.19
Humility	-.18	-.15	.03	-.27*
Surprise	-.10	.24*	-.28*	-.08
Curiosity	.17	.10	-.28*	-.04
Sympathy	.22	-.25*	0	.07
Shame	0	.11	-.14	-.19
Pride	.25*	-.19	-.05	-.06
Joy	.25*	-.28*	-.13	-.07
Daring	.24*	.06	-.12	.09
Hope	.24*	-.08	.07	.05
Contempt	.11	.27*	.03	-.06
Sentimental	.25*	-.03	.08	.14
Anger	.16	.23*	.08	-.15
Disgust	-.06	.20	.08	-.10

	RPA	AIM	Betts[a]
Amusement	.03	.03	-.22
Boredom	-.06	.01	-.07
Fear	-.08	.09	.12
Sadness	-.06	.11	0
Affection	.10	.02	-.12
Humility	-.29**	-.22	.05
Surprise	-.16	.20	.34**
Curiosity	.06	.17	-.02
Sympathy	.06	-.09	-.11
Shame	-.14	-.05	.19
Pride	.10	-.05	-.04
Joy	-.08	.01	-.09
Daring	.32**	-.04	-.07
Hope	.11	-.03	-.21
Contempt	.02	.07	.13
Sentimental	.13	.08	-.20
Anger	.11	.28*	-.07
Disgust	0	.16	0

*$p < .05$. **$p < .01$. two-tailed.
[a] low score means good mental imagery ability

Table 23

Correlations between Personality Inventories and Subject Mean Frequency and Intensity Ratings and Peer Mean Ratings (N = 72)

	Emotions		
Personality inventory	Mean frequency ratings	Mean intensity ratings	Mean peer ratings
Extraversion	0	.16	.20
Neuroticism	.17	-.05	.15
IDQ (verbal)	-.03	0	-.11
IDQ (visual)	0	.03	-.07
Role-playing	-.04	.05	.05
Affect intensity	.07	.02	.13
Mental imagery[a]	.11	-.29*	-.08

*$p < .01$. two-tailed.
[a] low score means good mental imagery ability

the intensity with which they experienced emotions was positively correlated with extraversion. Mean peer ratings were significantly correlated with extraversion.

Correlations between Peer-Ratings of Role-Playing Ability and Self-Reported and Peer-Reported Emotional Experience

When correlations were calculated between peer ratings of subjects' role-playing ability and subjects' frequency ratings on individual emotions a rather unusual and unexpected pattern emerged (see Table 24). Correlations on all emotions were negative, indicating that when subjects were perceived by their peers to be good role players subjects felt these emotions less frequently in everyday life. However, only the correlation for surprise was significant. Correlations of peer ratings of role-playing ability with subjects' intensity showed no distinctive pattern. Again, only one correlation, humility, was significant.

When peer ratings of role-playing ability were correlated with peer ratings of emotionality nearly all significant correlations were obtained for positive emotions, indicating that subjects perceived to be good role players, were also seen to experience positive emotions more often. The only exception was fear for which the reverse was true.

Table 24

Correlations of Peer Ratings of Role-Playing Ability with Subject and Peer Mean Ratings of Emotions

Emotion rating	Correlation of peer rating (RPA) with Subject Frequency (N=71)	Subject Intensity (N=63)	Peer Ratings (N=72)
Amusement	-.14	.03	.30**
Boredom	-.16	.10	.07
Fear	-.12	-.02	-.21
Sadness	-.05	.08	.09
Affection	-.07	.16	.12
Humility	-.06	.24*	-.12
Surprise	-.21	.09	-.09
Curiosity	-.06	.07	.23*
Sympathy	-.15	.11	.07
Shame	-.04	.07	-.09
Pride	-.19	-.03	.27*
Joy	-.15	.14	.15
Daring	-.03	.14	.28*
Hope	-.14	.13	.23*
Contempt	-.04	.10	.06
Sentimental	-.17	-.04	.30**
Anger	-.06	.02	.17
Disgust	-.02	.12	-.03
Mean	-.10	.08	.10

*$p < .05$. **$p < .01$. two-tailed.

Summary

Except for role-playing ability and verbal thinking style, male and female subjects differed significantly on all personality inventories with females generally scoring higher. When subjects were separated by role-playing ability, good role players, both male and female, scored significantly higher on most personality inventories. The same results were obtained for females who participated in the Phase II and III of the study.

Self-reported role-playing ability correlated significantly with all personality inventories; peer-reported role-playing ability correlated with extraversion, verbal thinking style, and mental imagery ability.

Latin square analyses of variance indicated that good role players had higher heart rate increases but lower respiration rates during emotional imagery.

Although several significant correlations between laboratory measures and personality inventories were obtained, it did not show a clear and distinctive pattern. Different laboratory measures were related to different personality variables.

Most significant correlations between subjects' frequency of the 18 emotions and personality inventories were obtained for neuroticism; subjects' emotional intensity, on the other hand, correlated mostly with mental imagery ability while peer ratings correlated predominantly with neuroticism and extraversion.

Peer ratings of role-playing ability correlated significantly with peer emotionality ratings on several positive emotions.

CHAPTER IV

DISCUSSION

Different Emotions Require Different Strategies

The results of our study have demonstrated that the experience of sadness, anger, fear, and joy through imagery in the laboratory was not identical. Individual emotions varied substantially with respect to the ease and intensity with which they were experienced, though it was not contingent on whether an emotion was positive or negative. Our data have also shown that the types of strategies people used to become involved in ideation depended to a large extent on the emotion that was to be elicited. Thus, each emotion was facilitated by a different set of strategies. It should be pointed out, however, that all strategies were utilized in every emotional situation; it was the degree to which a strategy was used that differed from one emotion to another.

Unfortunately, the data from the laboratory session were not totally consistent. Analyses of the between-emotion conditions suggested that the use of strategies was independent of emotional reactivity, but correlations of the within-emotion conditions indicated that the success and intensity of emotional imagery was related to specifc types of strategies.

Strategies for Emotional Ideation in General

During imagery different emotions are facilitated by different strategies. There is sufficient evidence that emotional imagery is not exclusively a visual activity but a combination of different imagery modes weighted by the particular emotion. Yet, while the use of strategies in emotional imagery differs from one emotion to another, we also found a distinct pattern of strategies that seems to facilitate emotional ideation in general. It appears, then, that emotional imagery is foremost a visual activity, followed by verbal activity, and finally motor activity. During imagery the individual is more likely to act as a participant than an observer, and preference is given to actual past experiences over mentally constructed ones to become emotionally aroused, though the two sources of imagery frequently overlap. However, the contribution of each strategy to emotional imagery in general (independent of any specific emotion) is altered when the success and intensity of the specific emotional experiences are taken into consideration. **Successful** imagery of any emotional situation is primarily related to a motor strategy and a participant orientation and, to a lesser extent, to visual and verbal strategies while the **intensity** of the experience is only related to a motor strategy.

It is unclear whether the use of a particular strategy is dependent on the nature of the emotion or whether it is

the specific circumstances of the emotional event that determines the strategy, though one would expect these two to be interrelated. Did subjects, for example, choose an observer orientation during sad imagery because of the nature of sadness, or was it the funeral and wake scenes that demanded an observer status? Future research needs to address this question.

Strategies for Emotional Ideation with Regard to Specific Emotions

Despite the finding of a particular constellation of strategies that seems to facilitate emotional imagery in general, individual strategies varied significantly among the four emotions that were used in this study.

Sadness

Subjects reported the greatest success and the most intense experiences when asked to imagine a sad situation; however, the ratings for sadness did not differ significantly from anger and joy. A possible explanation for the high ratings of sadness can be found in the specific situations subjects imagined. The majority of subjects (54%) envisioned the death of a family member or close friend, and surprisingly, for most subjects these were events that had actually occurred. The second most frequent situation (24%) was separation from friends or

family. Both categories are obviously events of great personal impact and their significance to the individual should facilitate emotional ideation.

Among strategies, the observer orientation was the only one used more frequently during sad situations than during the other emotional situations. Lyman (1984) has argued that an observer attitude is likely to inhibit emotion in that we perceive ourselves as being separate from the experience. Qualls (1982), too, has stated that an observer orientation assumes a certain degree of passivity and consequently involves detachment from active engagement in the situation. It is conceivable, then, that in the sadness condition our subjects intentionally chose an observer orientation to distance themselves from the upsetting event. This is not to say that one remains necessarily emotionally detached; for example, watching a sad movie can evoke intense feelings of sadness as well as tears and crying without the viewer becoming actively engaged in the movie itself. Yet, if we extend Lyman´s argument, adopting an observer attitude should lead to lower success and intensity ratings of the emotional event. In our study this was clearly not the case since sadness received the highest success and intensity ratings despite an observer orientation. Thus, an observer attitude does not necessarily inhibit emotional reactivity; it might depend on the type of emotion and the particular situations to be imagined.

Not only is an observer orientation passive, sadness itself is an emotion that is rather passive too. Circumstances responsible for feelings of sadness are frequently beyond one's control; situations where one is confronted with the inevitability of death or separation allow for little else but passive acceptance or resignation (Averill, 1968; Schwartz, Weinberger, & Singer, 1981). Many subjects who recalled the death of a friend or family member imagined the funeral and wake of the deceased person. In such a case, active engagement may have been constrained by the nature of the imagined event.

Correlational analyses of the within-emotion conditions indicated that sadness follows more closely the general pattern of strategies. Thus, successful involvement in sad situations was moderately but significantly related to a motor and verbal mode, as well as a participant orientation and actual recall of a sad event. The intensity of sad imagery was related only to motor activity. It wil be noted that these results are somewhat different from those of the between conditions (latin square analyses).

Anger

Subjects were very successful in eliciting anger through emotional ideation and rated the experiences as very intense. Imagined scenes focused predominantly (63%) on arguments or "fights" with persons significant to the

individual, such as boyfriends, girlfriends, or roommates. Averill (1982) has found that the most common targets of anger tend to be loved ones, friends, or acquaintances. Thus, our subjects were typical in their target selection during anger imagery.

Contrary to sadness, several strategies were used more frequently in imagery situations of anger than in other emotional situations. Our data indicate that a typical episode of anger was a recalled experience that required the subject to adopt a participant orientation together with a verbal and a motor mode. This is not surprising since anger, more than any other emotion, tends to be very active in its behavioral manifestations. In general, an argument or confrontation with another person requires an individual to be actively engaged in the situation. Furthermore, an argument is characterized by verbal exchanges between the two opponents and often involves bodily or motor responses such as muscular tension, shaking, grimacing, and feeling flushed.

Correlations between successful imagery of anger and strategies for involvement **within** the anger condition reflected largely the general case of emotional imagery. Successful imagery was significantly related to a motor strategy and also, though less, to a visual and verbal strategy. However, success did not correlate significantly with a participant orientation. The intensity of anger, as in the general case, was significantly related to the motor

strategy. Except for the visual mode and the participant orientation results of the within-emotion condition were consistent with those of the between-emotion conditions.

Joy

Much like sadness and anger, subjects were very successful in inducing joy through imagery. The majority of the imagined situations (68%) involved family members or close friends. More specifically, 35% of the subjects imagined the first date with their current boyfriends, or enjoying spending time with close friends, and 33% imagined seeing friends or family members after a time of separation.

Two strategies, participant orientation and visual mode, were preferred in eliciting joy in comparison with other emotions, except for anger in which a participant orientation was equally employed. These strategies might have been chosen as a direct result of the types of situations imagined.

Again, correlations of successful imagery with strategies for involvement **within** the joy condition suggested a closer relationship to the general case of emotional imagery. Significant correlations were highest for the motor mode and the participant orientation followed by the verbal and visual mode. The intensity of joy, on the other hand, though significantly related to a motor

strategy, was also related to a participant orientation and a visual mode.

Fear

There is widespread evidence in the literature that imagery of fearful events induces genuine and intense emotional arousal (Lang, Kozak, Miller, Levin, & McLean, 1980; Schwartz et al., 1981). Our data do not support these findings. We found fear to be the least successful and intense emotion to evoke through imagery. Unlike for other emotions, there was no prevalent theme in the types of fear situations subjects imagined (26% imagined being followed by a stranger at night, potentially being raped, or hearing noises at night while being home alone; 21% imagined being in a car accident or dying from a terminal illness; 19% imagined falling, hanging, or slipping of a cliff or a bridge; and 34% imagined miscellaneous events).

Mental construction was the only strategy that was used more often with fear than with the other emotions. Fear, more than most emotions, tends to be "future-oriented" in that we frequently fear situations that we have never actually experienced. As we mentioned in the introduction, Lyman, Bernardin, and Thomas (1980) have shown that an imagined situation does not have to be an actual past experience in order for it to be emotionally arousing. They found emotional imagery with references to future events to be quite frequent. Unfortunately, the

study by Lyman et al. did not identify individual emotions and how they related to image referents. Thus, whether future-oriented fear imagery is as intense as imagined past experiences can not be discerned. It is reasonable to assume that unless the imagined fearful situation had been a real occurrence in the past, one is less likely to become highly emotionally aroused. Perhaps few subjects in our sample had experienced truly frightening situations in their lives and therefore had to create events that they had not actually experienced. Although many subjects reported having at least one fearful event a day during the two-week follow-up, given the situations that they actually imagined in the laboratory and the high ratings of mental construction, it is questionnable if the daily events could really be considered fearful events or whether they would be more appropriately classified as anxiety situations. This argument is further supported by the fact that the intensity of fear in everyday life received the second lowest rating among all emotions.

Moreover, it is conceivable that, in our study, subjects were intentionally trying to avoid strong fear arousal since, to a certain extent, an observer orientation was also adopted in the fear condition. But unlike in the sadness condition Lyman´s argument here might be a valid explanation for the low success and intensity ratings of fear in that an observer attitude keeps the experience

separate from the individual, thereby inhibiting emotional arousal.

Analyses of the **within-fear** condition indicated a closer relationship to the general pattern of strategies for successful imagery but not for the intensity of fear imagery. Thus, successful fear experience was related to a motor strategy and a participant orientation and, to a lesser extent, a visual strategy, whereas the intensity of fear did not significantly correlate with a motor strategy.

Physiological Reactivity during Emotional Imagery

Consistent with reports in the literature our subjects experienced greater physiological arousal during emotional imagery than during resting periods. Heart rate in particular showed the most significant increases from base rates though actual sizes were rather small compared to those reported by Schwartz et al. (1981). Respiration changes were significant but less dramatic for most emotions; for sadness respiration differed only marginally from baseline rates and in a negative direction. We pointed out in the introduction that results reported in the literature on skin conductance as a measure of emotional imagery have been very inconsistent. Skin conductance data from our study indicates that it is not a reliable measure of emotional imagery.

Contrary to our expectation, differences in heart rates between target emotions were not significant. But greater heart rate changes occurred during sadness and anger than during joy and fear. This pattern of heart rate responses to emotional imagery is somewhat distinct from the one reported by Schwartz et al. (1981), particularly for the fear condition. They recorded higher heart rates for anger and fear than for sadness and happiness, though only happiness was significantly different from anger and fear.

In our study, subjects' respiration rates differed significantly for all but two possible pairs of emotions. Surprisingly, we found an almost exact inverse pattern to the one generated by heart rate. Fear imagery produced the highest respiration rates while sadness reduced breathing rates to even below baseline levels. Although a negative relationship between heart rate and respiration is not unusual because the two are linked by a feedback loop, we were unable to determine from the physiological charts precisely why this relationship was obtained.

The effort to find objective physiological evidence for emotional imagery has frequently been made at the expense of comprehensive self-report measures. Though self-reports are the most common mode of data collection, psychologists are keenly aware of the inherent problems associated with subjective data, particularly in research on mental imagery. However, as Qualls (1982-83) has

pointed out, the covert and private nature of imagery, whose components and processes must be inferred by the observer, make it essential to include self-report measures in addition to physiological measures. The reluctance to rely on subjective reports is evident even in such cognitive models as Lang´s bio-informational theory of emotional imagery, which was derived largely from psychophysiological measurements. Although Lang did solicit verbal reports on imagery in his studies, they were confined primarily to ratings of vividness and intensity. The sentiment against subjective reports is exemplified by Lang in the following statement:

> "While retrospective reports of image processing provide a rich fabric of information, they are not ideal scientific indices of actual image structure. They have the defect that they are necessarily delayed (if given simultaneously our assessment modifies the thing measured in unpredictable ways), and as dream analysts know well, it is difficult to separate out from such reports what is information about the image and what represents retrospective additions, subtractions, or subjective biases of the reporting context." (Lang, 1979, p. 502)

Yet, when self-report measures are included in studies on emotional imagery the correspondence between physiological arousal and subjective ratings of emotional reactivity is far from ideal. We recorded physiological reactivity to imagery as an independent and objective measure of arousal, supplementing the more subjective self-report ratings of emotional reactivity. Our data showed that, in general, the patterns of heart rate and

respiration across the four emotions closely paralleled the patterns of success and intensity ratings; that is, emotions with higher heart rates and lower respiration (recall the inverse relationship between heart rate and respiration) were also rated more successful and intense, and vice versa. Unfortunately, when reactivity ratings and recordings were averaged over the four emotions very little correspondence remained between self-report ratings of emotional reactivity and physiological arousal. Correlations between physiological arousal and successful involvement were higher than those of physiological arousal and self-rated intensity, which was somewhat unexpected.

The relationship between physiological reactivity and strategies for emotional involvement yielded inconsistent and mostly nonsignificant results that were difficult to interpret.

Personality Characteristics and Emotional Imagery

Consistent with our hypothesis, role-playing ability was related to physiological arousal during emotional imagery. Significant changes were obtained for heart rate and respiration but not for skin conductance. Good role-players exhibited greater heart rate changes during imagery than poor role-players. On the other hand, good role-players had lower respiration rates than poor role-players. As we mentioned earlier, this is probably due to the

feedback loop between heart rate and respiration. Our hypothesis, however, was not confirmed with respect to the self-report measures of emotional reactivity. High- and low role-players did not differ in their self-reported arousal and success of emotional imagery. Furthermore, role-playing did not correlate significantly with any of the 18 everyday emotions, on either the frequency or intensity measure. Thus, we were unable to even replicate the results of the pilot study by Fletcher and Averill (unpublished data). In fact, most correlations between RPA and subjects' frequency of emotions were negative, and correlations did not change in a positive direction when they were corrected for imagery ability as measured by Betts.

Of the other personality characteristics none were related to self-reported emotional reactivity in the laboratory, though extraversion and mental imagery ability seemed to be the best predictors overall of emotional involvement in imagery. Interestingly, role-playing did better than neuroticism in predicting the intensity of an emotional experience in the laboratory.

The relationship of personality traits to the experience of everyday emotions is noteworthy in two respects. First, neuroticism correlated significantly with many emotions on the frequency dimension, including fear, sadness, and anger, and all but one of the emotions were negative. Our data thus support Eysenck's (1968) assertion

that the concept of neuroticism is primarily indicated for negative emotionality. It appears, however, that highly neurotic individuals experience negative emotions more frequently but not necessarily more intensely. Eysenck has argued that neuroticism is related to activity in the limbic and autonomic nervous system, which would pertain to the strength of arousal or intensity of an emotional experience. In light of our data it is doubtful to what extent this argument is correct, particularly since neuroticism was not related to any of the physiological measures which are under the control of the autonomic nervous system.

The second reason the relationship of personality traits to the experience of everyday emotions is noteworthy is that mental imagery ability as measured by the Betts correlated significantly with many emotions on the intensity dimension. Individuals with good imagery abilities tended to have more intense emotional experiences in their daily lives, regardless of whether they were positive or negative. These results lend support to Lyman's argument that imagery plays a central role in emotional experiences, at least with respect to their intensity. With respect to the frequency of emotions, mental imagery ability correlated predominantly in the opposite direction, suggesting that good imagers actually have fewer emotional experiences. It appears that along an imagery ability dimension the frequency and intensity of

daily emotional experiences are relatively independent. This conclusion is tentative since the size of the correlations was only moderate. In addition, emotional experiences were slightly more intense when the individual was extraverted.

Other personality traits did not correlate with either frequency or intensity of everyday emotions. Particularly surprising is the fact that the AIM did not correlate significantly with the intensity of emotional experiences in daily life or the laboratory, nor did it correlate with physiological reactivity. Several correlations with the intensity of daily emotions were actually negative. Larsen, Diener, and Emmons (1986) have reported that high affect-intense subjects respond more emotionally to standardized life events than low intense subjects. In our study, we asked subjects to rate the intensities of 18 kinds of emotional responses to daily life events. Our data did not support the results obtained by Larsen et al. (1986). Further studies are needed by independent researchers to evaluate the reliability and usefulness of the AIM as a measure of affect intensity.

Our data showed no significant relationship between personality traits and cognitive strategies for involvement in emotional imagery. However, even though not statistically significant, it is nevertheless noteworthy that verbal thinking ability as measured by the IDQ correlated highest with a verbal strategy during imagery,

and a visual thinking habit correlated highest with a visual strategy. Given that the relationship between the two cognitive styles of the IDQ and the two strategies were based on single items the correlations were quite impressive. This provides an independent validation of the IDQ being able to identify two distinct thinking styles.

Peer Ratings of Emotionality and Personality Characteristics

We have stated in the introduction that analyses of peer ratings were largely exploratory and no specific hypotheses were generated. Yet, when subjects´ personality characteristics were taken into consideration we found that peer ratings matched subjects´ own reports of emotionality quite well. Thus, when subjects were highly neurotic they were perceived by their peers to experience negative but not positive emotions more often. This is largely congruent with the self-reports of neurotic individuals. Individuals were also judged by their peers to experience most of the 18 emotions more often when they had good imagery abilities. Despite the fact that peer ratings are essentially frequency ratings, correlations of peer ratings more closely resembled those of subject ratings on the intensity dimension than on the frequency dimension. Peers rated individuals who are extraverted as being more emotional with regard to positive emotions but not negative

emotions. Perhaps extraverted individual are more likely to display positive emotions outwardly but tend to better conceal negative emotions.

Peer ratings of subjects' role-playing ability were based on a single item; nevertheless, it correlated highly with subjects' actual scores on the Role-Playing Scale. But our data on peer ratings of role-playing ability and subjects' self-rated emotionality were somewhat disappointing. Peer-rated role-playing ability correlated negatively with subjects' frequency of every emotion. Thus, both self- and peer-rated role-playing ability and their relationship to the frequency of emotions in daily life are contrary to expectations. Correlations between peer-rated role-playing ability and self-reported emotional intensity were inconsistent and therefore difficult to interpret.

Sex Differences in Personality Characteristics

A number of personality inventories showed significant sex differences that are quite consistent with other published data. Comparisons between males and females in our total sample of subjects indicated that females were more extraverted, neurotic (emotionally labile), and affectively intense, and they also showed a greater tendency towards visual thinking than males. The only unexpected sex difference was found on the Lie scale of the

Eysenck Personality Inventory, where females received significantly higher scores than males.

When subjects were separated by role-playing ability and sex, males with good role-playing ability scored significantly higher than males with poor role-playing ability on all personality traits except affect intensity and lying for which no differences were found. Females with good role-playing ability scored significantly higher on all but one personality inventory (the Lie scale) than females with poor role-playing ability. This was also true for the sample of females who participated in Phase II of the experiment. Only on the Lie scale did all females with poor role-playing ability score higher while no differences were found among the women who took part in Phase II. Why good role players scored higher on almost all personality measures is difficult to answer, but the Role-Playing Scale correlated significantly with these inventories indicating that they share some common variance.

Relationship between Emotional Reactivity in the Laboratory and in Everyday Life

Our data has shown only a weak relationship between emotional reactivity in the laboratory and reactivity in everyday life on the specific target emotions. Thus, whether a person is able to experience intense sadness, anger, fear, or joy in the laboratory is not a good

indication of the extent to which she experiences the same emotions in daily life. However, we did find higher correlations between the intensity of emotional experiences in the laboratory and the frequency (rather than the intensity) of the same emotions in daily life. This suggests a tendency that the more often one experiences a particular emotion the more intensely one is able to reproduce that emotion voluntarily. When emotional reactivity in the laboratory was related to overall emotionality in everyday life correlations with daily frequencies of emotions remained superior to those of intensity. Hence, familiarity with emotions in general but not the intensity with which they are experienced appears to be an important factor when emotions are to be evoked successfully under controlled circumstances in the laboratory. Moreover, the frequency of everyday emotions did vary to a large extent independently of their intensity, since most correlations were low and nonsignificant.

Despite the limitations of measuring emotional reactivity in the laboratory exclusively along an intensity dimension, we can conclude that people who respond intensely to emotional imagery do not necessarily respond intensely to everyday emotions. This conclusion is further supported by the lack of relationship between subjects' intensity of affect (as measured by the AIM) and the success and intensity ratings given in the laboratory

situations. By the same token, one should bear in mind that the relationship between intensity in the laboratory and frequency of emotions in daily life was not significant and further studies are needed to clarify the link between emotionality in the laboratory and in everyday affairs.

The relationship between strategies for emotional involvement in the laboratory and emotionality in everyday life was not very robust either. Yet, several trends did emerge.

Subjects used more visual and motor strategies in the laboratory when they experienced everyday emotions more frequently, but used a verbal strategy more often when everyday emotions were less intense in their lives.

As we said earlier, the relationship between peer ratings and subject ratings of emotionality was of an exploratory nature. Most correlations were too low to warrant any specific conclusion.

Summary

We found significant differences in the use of strategies among the four target emotions. We also found a pattern of strategies that facilitated emotional imagery in general. All strategies were used in every imagery situation; yet, the extent to which each strategy was used depended on the specific emotion. Imagery of sadness created the most successful and intense emotional

experience, imagery of fear, on the other hand, was the least successful and intense experience. Analyses of the within-emotion conditions indicated that the success and intensity of an emotional situation is related primarily to a motor strategy and a participant orientation.

Heart rates and respiration rates were significantly higher during imagery than during resting periods, though actual changes were rather small when compared to other studies in the literature. Skin conductance, on the other hand, was not a reliable measure of emotional imagery. Differences in physiological arousal between the four target emotions were only significant for respiration. Physiological responses during imagery of individual emotions largely paralleled self-ratings of success and intensity, yet, when the data were averaged over all emotions the correspondence disappeared.

Among personality traits only role-playing ability was significantly related to heart rate and respiration, but not to skin conductance. No significant relationship was found between any of the personality charateristics, including role-playing ability, and self-reported emotional reactivity. We also found no significant correlations between personality traits and strategies for emotional involvement.

The relationship of personality traits to the experience of everyday emotions was only significant for neuroticism and mental imagery ability. Neuroticism was

related to the frequency but not the intensity of emotions and correlated significantly only with negative emotions. Mental imagery ability correlated significantly with intensity ratings of everyday emotions.

Peers rated neurotic subjects as experiencing negative emotions more often. This was consistent with neurotic subjects' own ratings of emotional frequency. Peers also attributed more emotional experiences to subjects with good imagery abilities. Peer ratings of role-playing ability correlated highly with subjects' score on the Role-Playing Scale.

We found significant sex differences on almost all personality inventories with females usually scoring higher than males. When subjects were separated by role-playing ability, good role players, both male and female, scored higher on the other personality traits than poor role-players.

Familiarity with emotions in daily life appears to be more important than their intensity when eliciting imagery of intense emotional experiences in the laboratory. The use of visual and motor strategies during imagery in the laboratory were correlated with a higher frequency of everyday emotions while a verbal startegy was related to a lower intensity of daily emotions.

APPENDICES

APPENDIX A

Bio-informational Theory of Emotional Imagery

In the introduction we stated that Lang's bio-informational theory has been the most influential theory of emotional imagery to date. This appendix elaborates more specifically on how Lang has tested his model.

Testing Lang's model generally requires three input variables: 1) the image cue, which is the instruction to imagine something; 2) the image aid, usually in the form of an elaborate script that is to be imagined; and 3) the instruction of the subject to function as an active participant in the imagined situation. The output variables are the subjects' verbal reports and physiological responses. The general research paradigm proceeds as follows: Sample imagery scripts are created for a particular emotion, e.g. fear. One set of scripts contains only stimulus propositions while the other includes stimulus as well as response propositions. Each set of scripts is then presented to two groups of subjects. One group is asked to imagine the stimulus-oriented scripts, the other is asked to imagine the response-oriented scripts. Following each imagined script the subjects within their respective groups report their imagery experience and are reinforced if their descriptions contain stimulus or response propositions. In this way, subjects are trained over a series of scripts to attend and respond exclusively to the propositions in their assigned categories. Finally, to test the theory, each group is presented with two sets of imagery scripts (e.g. fear scenes and action scenes) in the category that they have been trained in. In addition, they are asked to imagine a set of neutral scenes containing only stimulus propositions. Data are then collected on verbal reports and physiological reactivity. The theory predicts greater efferent activity in response-trained subjects than in stimulus-trained subjects and greater arousal with emotional than non-emotional imagery content.

Although Lang has trained his subjects to respond to the appropriate propositions, other studies have shown that imagery training is not essential, simple instructions to process stimulus- or response information seem to suffice (Carroll, Marzillier, & Merian, 1982; Dekker & Everaerd, 1988b). Thus, instructions to focus on one's emotional reactions during imagery (response orientation) should facilitate physiological arousal as well as subjective ratings of emotional intensity.

APPENDIX B

Eysenck Personality Inventory

Q U E S T I O N N A I R E 1

Name _____ Sex _____ Date _____

INSTRUCTIONS

Here are some questions regarding the way you behave, feel and act. Each question is to be answered with either YES or NO. Attached to the questionnaire is an opscan sheet on which you are to record your answers. YES corresponds to the letter A, NO corresponds to the letter B within a circle on the opscan sheet.

Read each statement and decide whether YES or NO represents your usual way of acting or feeling. Then mark the appropriate circle (A for YES, B for NO) on the opscan sheet. Do not write your answers on the questionnaire itself.

In marking your answers on the answer sheet, be sure that the number that you are answering is the same as the number on the answer sheet.

Work quickly, don´t spend too much time over any question. The whole questionnaire shouldn´t take more than 15 minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers.

Before you begin to answer any questions please mark your sex and the date in the appropriate boxes on the opscan sheet.

A = YES B = NO

1. Do you like plenty of bustle and excitement around you?
2. Have you often got a restless feeling that you want something but do not know what?
3. Do you nearly always have a "ready answer" when people talk to you?
4. Do you sometimes feel happy , sometimes sad, without any real reason?
5. Do you usually stay in the background at parties and "get- togethers"?
6. As a child did you always do as you were told immediately and without grumbling?
7. Do you sometimes sulk?
8. When you are drawn into a quarrel, do you prefer to "have it out" to being silent hoping things will blow over?
9. Are you moody?
10. Do you like mixing with people?
11. Have you often lost sleep over your worries?
12. Do you sometimes get cross?
13. Would you call yourself happy-go-lucky?
14. Do you often make up your mind too late?
15. Do you like working alone?
16. Have you often felt listless and tired for no good reason?
17. Are you rather lively?
18. Do you sometimes laugh at a dirty joke?
19. Do you often feel "fed-up"?
20. Do you feel uncomfortable in anything but everyday clothes?
21. Does your mind often wander when you are trying to attend closely to something?
22. Can you put your thoughts into words quickly?
23. Are you often "lost in thought"?
24. Are you completely free of prejudices of any kind?
25. Do you like practical jokes?
26. Do you often think of your past?
27. Do you very much like good food?
28. When you get annoyed do you need someone friendly to talk to about it?
29. Do you mind selling things or asking people for money for some good cause?
30. Do you sometimes boast a little?
31. Are you touchy about some things?
32. Would you rather be at home on your own than go to a boring party?
33. Do you sometimes get so restless that you cannot sit long in a chair?
34. Do you like planning things carefully, well ahead of time?
35. Do you have dizzy spells?

A = YES B = NO

36. Do you always answer a personal letter as soon as you can after you have read it?
37. Can you usually do things better by figuring them out alone than by talking to others about it?
38. Do you ever get short of breath without having done heavy work?
39. Are you an easy-going person, not generally bothered about having everything "just-so"?
40. Do you suffer from "nerves"?
41. Would you rather plan things than do things?
42. Do you sometimes put off until tomorrow what you ought to do today?
43. Do you get nervous in places like elevators, trains or tunnels?
44. When you make new friends, is it usually you who makes the first move, or does the inviting?
45. Do you get very bad headaches?
46. Do you generally feel that things will sort themselves out and come right in the end somehow?
47. Do you find it hard to fall asleep at bedtime?
48. Have you sometimes told lies in your life?
49. Do you sometimes say the first thing that comes into your head?
50. Do you worry too long after an embarrassing experience?
51. Do you usually keep "yourself to yourself" except with very close friends?
52. Do you often get into a jam because you do things without thinking?
53. Do you like cracking jokes and telling funny stories to your friends?
54. Would you rather win, than lose a game?
55. Do you often feel self-conscious when you are with superiors?
56. When the odds are against you, do you still usually think it worth taking a chance?
57. Do you often get "butterflies in your stomach" before an important occasion?

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS.

APPENDIX C

Role-Playing Scale

Q U E S T I O N N A I R E 2

Name _____ Sex _____ Date _____

INSTRUCTIONS

Please indicate your agreement or disagreement with the following 40 items, according to the following scale:

AGREE	AGREE MORE THAN DISAGREE	DISAGREE MORE THAN AGREE	DISAGREE
A	B	C	D

Attached to the questionnaire is an opscan sheet on which you are to record your answers. AGREE corresponds to the letter A, AGREE MORE THAN DISAGREE corresponds to the letter B, DISAGREE MORE THAN AGREE corresponds to the letter C, and DISAGREE corresponds to the letter D within a circle on the opscan sheet.

Read each statement and decide whether you agree or disagree. Then mark the appropriate circle on the opscan sheet. Do not write your answers on the questionnaire itself.

In marking your answers on the answer sheet, be sure that the number that you are answering is the same as the number on the answer sheet.

Work quickly, don´t spend too much time over any question. The whole questionnaire shouldn´t take more than 15 minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers.

Before you begin to answer any questions please mark your sex and the date in the appropriate boxes on the opscan sheet.

AGREE	AGREE MORE THAN DISAGREE	DISAGREE MORE THAN AGREE	DISAGREE
A	B	C	D

1. I have been a member of a 4-H or Future Farmers of America or other agricultural groups.
2. I like to watch people for movements and mannerisms that set them apart from other people.
3. I am good at faking things.
4. I am able to exclude everything from my mind, construct a new, imagery world, and feel for a time that it is real.
5. I can imitate at least three well-known people.
6. I like to tinker with mechanical or electrical things, work on cars or repair household appliances, etc.
7. People tell me I am a good storyteller.
8. I have a serious interest in creative activities such as painting, writing, designing, and the like.
9. If asked to play the part of an elderly person living alone in a big city, I could do so convincingly.
10. I am sometimes able to get so absorbed in fantasy that I forget about my present self and become someone else in my imagination.
11. I would make a good forest ranger.
12. I have had the experience of telling a story with elaborations to make it sound better and then having the elaborations seem as real to me as the actual experience.
13. I do not have a good memory for the way people move, gesture, and make facial expressions.
14. I have participated in a high school or college play or other amateur theater production.
15. I can make just about anybody believe anything I say or do.
16. I like to ride a bicycle.
17. I like to imitate the way people talk, move, gesture, and make facial expressions.
18. While watching a movie or show I sometimes become so involved that I feel myself participating in the action.
19. If asked to play the part of a Russian peasant, I could do so convincingly.
20. I often try to guess what people are thinking before they tell me.
21. If asked to draw someone riding a horse, I could do convincingly.
22. If I wish, I can imagine (or daydream) some things so vividly that they hold my attention in a way a good movie or story does.
23. When telling a story I like to play the parts of all the different people involved.

AGREE	AGREE MORE THAN DISAGREE	DISAGREE MORE THAN AGREE	DISAGREE
A	B	C	D

24. If asked to play the part of a "hillbilly" factory worker whom everyone makes fun of, I could do so sympathetically.
25. I have had the experience of imagining something so hard that it became almost real for me.
26. I have participated in high school or college athletics.
27. I am good at playing the game of charades (acting out a concept in pantomime so that others can guess its meaning).
28. When talking with people, I pay more attention to what they say than how they say it.
29. I have a good memory for voices and the way people talk.
30. When I read a novel, I become very involved, experiencing what´s going on, joining in with the action and characters.
31. I would make a good physician.
32. People always seem to know when I´m not telling the complete truth.
33. After acting in a play myself, or seeing a play or movie, I have felt partly as though I were one of the characters.
34. I can usually "put on a show" and liven things up without being self-conscious about it.
35. When I dance I often lose myself in the music and movement.
36. If given the chance for free parachute jumping lessons, I would accept the offer.
37. I am good at mimicking accents.
38. I like to imagine myself as being various types of people.
39. When telling a story I´m more interested in presenting the facts rather than creating a mood.
40. If asked to play the part of a tightrope walker with hiccups, I could do a convincing job of it.

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS.

APPENDIX D

Affect Intensity Measure

Q U E S T I O N N A I R E 3

Name _____ Sex _____ Date _____

INSTRUCTIONS

The following questions refer to reactions to typical life-events. Please indicate how YOU react to these events by marking a number corresponding to the scale below on the orange opscan sheet that is attached to the questionnaire. Each bubble on the opscan sheet has a number printed within it (from 0 to 9). Mark only those bubbles that have a corresponding number in the scale below, that is, from 1 to 6. Please base your answers on how YOU react, not on how you think others react or how you think a person should react.

NEVER	ALMOST NEVER	OCCASIONALLY	USUALLY	ALMOST ALWAYS	ALWAYS
1	2	3	4	5	6

In marking your answers on the answer sheet, be sure that the number that you are answering is the same as the number on the answer sheet.

Work quickly, don´t spend too much time over any question. The whole questionnaire shouldn´t take more than 15 minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers.

Before you begin to answer any questions please mark your sex and the date in the appropriate boxes on the opscan sheet.

NEVER	ALMOST NEVER	OCCASIONALLY	USUALLY	ALMOST ALWAYS	ALWAYS
1	2	3	4	5	6

1. When I accomplish something difficult I feel delighted or elated.
2. When I feel happy it is a strong type of exuberance.
3. I enjoy being with other people very much.
4. I feel pretty bad when I tell a lie.
5. When I solve a small personal problem, I feel euphoric.
6. My emotions tend to be more intense than those of most people.
7. My happy moods are so strong that I feel like I´m ´in heaven´.
8. I get overly enthusiastic.
9. If I complete a task I thought was impossible, I am ecstatic.
10. My heart races at the anticipation of some exciting event.
11. Sad movies deeply touch me.
12. When I´m happy it´s a feeling of being untroubled and content rather than being zestful and aroused.
13. When I talk in front of a group for the first time my voice gets shaky and my heart races.
14. When something good happens, I am usually much more jubilant than others.
15. My friends might say I´m emotional.
16. The memories I like the most are of those times when I felt content and peaceful rather than zestful and enthusiastic.
17. The sight of someone who is hurt badly affects me strongly.
18. When I´m feeling well it´s easy for me to go from being in a good mood to being really joyful.
19. "Calm and cool" could easily describe me.
20. When I´m happy I feel like I´m bursting with joy.
21. Seeing a picture of some violent car accident in a newspaper makes me feel sick to my stomach.
22. When I´m happy I feel very energetic.
23. When I receive an award I become overjoyed.
24. When I succeed at something, my reaction is calm contentment.
25. When I do something wrong I have strong feelings of shame and guilt.
26. I can remain calm even on the most trying days.
27. When things are going good I feel ´on top of the world´.
28. When I get angry it´s easy for me to still be rational and not overreact.
29. When I know I have done something very well, I feel relaxed and content rather than excited and elated.
30. When I do feel anxiety it is normally very strong.

NEVER	ALMOST NEVER	OCCASIONALLY	USUALLY	ALMOST ALWAYS	ALWAYS
1	2	3	4	5	6

31. My negative moods are mild in intensity.
32. When I am excited over something I want to share my feelings with everyone.
33. When I feel happiness, it is a quiet type of contentment.
34. My friends would probably say I´m a tense or ´high-strung´ person.
35. When I´m happy I bubble over with energy.
36. When I feel guilty, this emotion is quite strong.
37. I would characterize my happy moods as closer to contentment than to joy.
38. When someone compliments me, I get so happy I could ´burst´.
39. When I am nervous I get shaky all over.
40. When I am happy the feeling is more like contentment and inner calm than one of exhilaration and excitement.

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS.

APPENDIX E

Individual Differences Questionnaire

Q U E S T I O N N A I R E 4

Name _____ Sex _____ Date _____

INSTRUCTIONS

Here are some questions regarding the way you behave, feel and act. Each question is to be answered with either TRUE or FALSE. Attached to the questionnaire is an opscan sheet on which you are to record your answers. TRUE corresponds to the letter A, FALSE corresponds to the letter B within a circle on the opscan sheet.

Read each statement and decide whether TRUE or FALSE represents your usual way of acting or feeling. Then mark the appropriate circle (A for TRUE, B for FALSE) on the opscan sheet. Do not write your answers on the questionnaire itself.

In marking your answers on the answer sheet, be sure that the number that you are answering is the same as the number on the answer sheet.

Work quickly, don´t spend too much time over any question. The whole questionnaire shouldn´t take more than 15 minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers.

Before you begin to answer any questions please mark your sex and the date in the appropriate boxes on the opscan sheet.

A = TRUE B = FALSE

1. I have no difficulty in expressing myself verbally.
2. Listening to someone recount his experiences does not usually arouse mental pictures of the incidents being described.
3. When reading fiction I usually form a mental picture of a scene or room that has been described.
4. Essay writing is difficult for me.
5. By using mental pictures of the elements of a problem, I am often able to arrive at a solution.
6. I enjoy being able to rephrase my thoughts in many ways for variety´s sake when both writing and speaking.
7. I enjoy visual arts, such as paintings, more than reading.
8. I tell jokes and stories poorer than most people.
9. I enjoy doing work that requires the use of words.
10. My daydreams are sometimes so vivid I feel as though I actually experience the scene.
11. I often use mental pictures to solve problems.
12. I enjoy reading an interesting story even if it is not particularly well written.
13. I find it difficult to find enough synonyms or alternate forms of a word when writing.
14. I have difficulty expressing myself in writing.
15. My knowledge and use of grammar needs improvement.
16. I would rather work with ideas than words.
17. I memorize material largely by the use of verbal repetition.
18. I enjoy learning new words and incorporating them into my vocabulary.
19. I do not have a vivid imagination.
20. I can easily picture moving objects in my mind.
21. Most of the time my thinking is verbal, as though talking to myself.
22. If given the choice, I would rather listen to a good speaker than visit an art gallery.
23. I find that I am more critical of writing style than content when reading literature.
24. I can form mental pictures to almost any word.
25. I have only vague visual impressions of scenes I have experienced.
26. My vocabulary is not as large as I would like.
27. When doing mental arithmetic, such as addition, I think in abstract terms rather than actually picturing the numbers.
28. I can easily think of synonyms for words.
29. I think that most people think in terms of mental pictures whether they are completely aware of it or not.
30. I am able to express my thoughts clearly.
31. I remember things I have done myself, much better than things I have read.

A = TRUE B = FALSE

32. My powers of imagination are higher than average.
33. I consider myself a fast reader.
34. I have a large vocabulary.
35. I find it easy to visualize the faces of people I know.
36. My marks have been hampered by inefficient reading.
37. It bothers me when I see a word used improperly.
38. I don't believe that anyone can think in terms of mental pictures.
39. I can easily form a mental picture of President Reagan.
40. I am fluent at writing essays and reports.
41. I would rather have a verbal description of an object or person, than a picture.
42. I can close my eyes and easily picture a scene I have experienced.
43. I have a photographic memory.
44. I feel a picture is worth a thousand words.
45. I cannot generate a mental picture of a friend's face when I close my eyes.
46. When someone describes something that happens to him, I sometimes find myself vividly imagining the events that happened.
47. I can add numbers by imagining them to be written on a blackboard.
48. I have found it easy in the past to learn a second language.
49. When I hear or read a word, a stream of other words often comes to mind.
50. I seldom dream.
51. I read rather slowly.
52. I am usually able to say what I mean in my first draft of an essay or letter.
53. I am good at thinking up puns.
54. I never use mental pictures or images when trying to solve problems.
55. While I have often seen pictures of him, I cannot remember exactly what President Reagan looks like.
56. I often remember work I have studied by imagining the page on which it is written.
57. Studying the use and meaning of words has become a habit with me.
58. I speak or write what comes into my head without worrying greatly about my choice of words.
59. Not enough people pay attention to the manner in which they express themselves.
60. I enjoy crossword puzzles and other word games.
61. I find it difficult to form a mental picture of anything.
62. Memorizing by verbal repetition is time consuming and inefficient.
63. My dreams are extremely vivid.
64. I have better than average fluency in using words.

A = TRUE B = FALSE

65. I read a great deal.
66. I am continually aware of sentence structure.
67. My thinking often consists of mental pictures or images.
68. I do not form a mental picture of people or places when reading of them.
69. I have often difficulty in explaining things to others.
70. My daydreams are rather indistinct and hazy.
71. I find it easier to learn from a demonstration than from written instructions.
72. I often enjoy the use of mental pictures to reminisce.
73. I often use mental images or pictures to help me remember things.
74. When remembering a scene I use verbal descriptions rather than mental pictures.
75. I take great pains to express myself with precision and accuracy in both verbal speech and written work.
76. I have never done well in learning languages.
77. The proper use of words is secondary to the ideas and content of speech or writing.
78. I have a better memory for things I read, rather than things I have experienced.
79. I am disturbed by people who quibble about word usage.
80. I have difficulty producing associations for words.
81. I have often ideas that I have trouble expressing in words.
82. I think that puns are the lowest form of humor.
83. Just before falling asleep I often find myself picturing events that have happened.
84. I prefer to read instructions about how to do something, rather than have someone show me.
85. I am a good story teller.
86. I spend very little time attempting to increase my vocabulary.

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS.

APPENDIX F

The Betts Questionnaire of Mental Imagery

Q U E S T I O N N A I R E 5

Participant # _____ Sex _____ Date _____

INSTRUCTIONS

This test will focus on your imagery ability. The items of the test will bring certain images to your mind. You are to rate the vividness of each image by reference to an accompanying rating scale, reproduced below. For example, if your image is "vague and dim" you give it a rating of 5.

Before turning to items on the next pages, familiarize yourself with the different rating scale categories printed below. Please do not leave any page until you have completed the items on the page you are doing, and do not go back to check on completed items. Complete each set before moving on to the next set. Try to do each item separately, independently of how you may have done other items.

The image aroused by an item of this test may be:

Perfectly clear and as vivid as
the actual experience ..... Rating 1
Very clear and comparable in vividness
to the actual experience ..... Rating 2
Moderately clear and vivid ..... Rating 3
Not clear or vivid, but recognizable ..... Rating 4
Vague and dim ..... Rating 5
So vague and dim as to be hardly discernible ..... Rating 6
No image present at all, you only "knowing"
that you are thinking of the object ..... Rating 7

An example of an item on the test would be one which asked you to consider an image which comes to your mind´s eye of a red apple. If your visual image was moderately clear and vivid you would check the rating scale and mark "3" in the space in between the parentheses.

Now turn to the next page when you have understood these instructions and begin the test.

Here is the rating scale in brief:

Perfectly clear and vivid:	Rating 1
Very clear:	Rating 2
Moderately clear:	Rating 3
Recognizable:	Rating 4
Vague and dim:	Rating 5
Hardly discernible:	Rating 6
No image at all:	Rating 7

Think of some relative or friend whom you frequently see, considering carefully the picture that rises before your mind's eye. Classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

Item	Rating
1. The exact contour of face, head, shoulders and body	( )
2. Characteristic poses of head, attitudes of body, etc.	( )
3. The precise carriage, length of step, etc, in walking	( )
4. The different colors worn in some familiar clothes	( )

Think of seeing the following item, considering carefully the picture which comes before your mind's eye; and classify the image suggested by the following question as indicated by the degree of clearness and vividness specified on the Rating Scale.

5. The sun as it is sinking below the horizon ..... ( )

Think of each of the following sounds, considering carefully the image which comes to your mind's ear, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

6. The whistle of a locomotive ..... ( )
7. The honk of an automobile ..... ( )
8. The meowing of a cat ..... ( )
9. The sound of escaping steam ..... ( )
10. The clapping of hands in applause ..... ( )

Here is the rating scale in brief:

Perfectly clear and vivid:	Rating 1
Very clear:	Rating 2
Moderately clear:	Rating 3
Recognizable:	Rating 4
Vague and dim:	Rating 5
Hardly discernible:	Rating 6
No image at all:	Rating 7

Think of "feeling" or touching each of the following, considering carefully the image which comes to your mind's touch, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

11. Sand ..... ( )
12. Linen ..... ( )
13. Fur ..... ( )
14. The prick of a pin ..... ( )
15. The warmth of a tepid bath ..... ( )

Think of performing each of the following acts, considering carefully the image which comes to your mind's arms, legs, lips, etc., and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

16. Running upstairs ..... ( )
17. Springing across a gutter ..... ( )
18. Drawing a circle on paper ..... ( )
19. Reaching up to a high shelf ..... ( )
20. Kicking something out of your way ..... ( )

Think of tasting each of the following, considering carefully the image which comes to your mind's mouth, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

21. Salt ..... ( )
22. Granulated (white) sugar ..... ( )
23. Oranges ..... ( )
24. Jelly ..... ( )
25. Your favorite soup ..... ( )

Here is the rating scale in brief:

Perfectly clear and vivid:	Rating 1
Very clear:	Rating 2
Moderately clear:	Rating 3
Recognizable:	Rating 4
Vague and dim:	Rating 5
Hardly discernible:	Rating 6
No image at all:	Rating 7

Think of smelling each of the following, considering carefully the image which comes to your mind´s nose and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

26. An ill-ventilated room ..... ( )
27. Cooking cabbage ..... ( )
28. Roast beef ..... ( )
29. Fresh paint ..... ( )
30. New leather ..... ( )

Think of each of the following sensations, considering carefully the image which comes before your mind, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified on the Rating Scale.

31. Fatigue ..... ( )
32. Hunger ..... ( )
33. A sore throat ..... ( )
34. Drowsiness ..... ( )
35. The fullness after having a large meal ..... ( )

APPENDIX G

Written Feedback (Phase I)

WRITTEN FEEDBACK

We are investigating the relationship among various personality assessment scales. It is not uncommon for personality tests of different domains to measure the same underlying dimensions whereas closely related personality tests often measure quite different dimensions. Thus, we are interested in the relationship among the tests you have just completed, which include a wide variety of standard personality measures.

We would like to thank you for your participation.

We are currently conducting another study on the ability of persons to become involved in emotional experiences, the relationship between that ability and everyday emotional reactivity. This other study involves a one and one-half hour laboratory session plus a diary record of emotional experiences during a two-week take-home assignment (requiring about 15 minutes a day). We will pay you $20 for your participation. If you would like to participate in this study, please fill out the following information and we may contact you at a later point in time.

If you would like to participate in this study, please provide the following information:

Name (please print) _____

Campus Address _____

_____

Telephone _____

APPENDIX H

Latin Square Design

FEMALES

High RPA

$S_1 - S_{10}$	A	J	F	S
$S_{11} - S_{20}$	J	S	A	F
$S_{21} - S_{30}$	F	A	S	J
$S_{31} - S_{40}$	S	F	J	A

Low RPA

$S_1 - S_{10}$	A	J	F	S
$S_{11} - S_{20}$	J	S	A	F
$S_{21} - S_{30}$	F	A	S	J
$S_{31} - S_{40}$	S	F	J	A

A = Anger F = Fear J = Joy S = Sadness

APPENDIX I

Daily Record

INSTRUCTIONS FOR DAILY RECORD

Keep, for two full weeks (14 consecutive days), a daily record of the number of times you experienced each of the emotions listed below (anger, fear, sadness, joy, etc.). Be sure to make your entries daily--it is recommended that you set aside a block of time from 10-15 minutes long each evening in which to record your data. Be organized, compulsive; it is important that you keep an accurate count of each kind of emotional reaction.

At first, you may find it difficult to remember the various incidents in which you reacted with one or another emotion. But you can teach yourself to become aware of your emotions as they occur, so that you can recall them later. The easiest way to recall an emotional experience is mentally to go through the major events of the day in the order they occurred (i.e., morning, first classes, lunch, afternoon, etc.), think about what you were doing, what incidents may have come up at that time, and what emotions you may have experienced. In addition to the more intense experiences, be sure to count the minor everyday emotional reactions that are easily forgotten.

Sometimes it is difficult to distinguish among various emotions, and between emotional and non-emotional experiences. Nevertheless, be as accurate as you can. A brief description of each emotion is given below, but these descriptions are only guidelines. Use your best intuitive judgement with regard to the number of times you became angry, joyful, etc.

For each day, there is a data sheet describing the 18 different emotions, and for each emotion there are two columns for recording your data. In the first column, indicate the number of times you experienced a particular emotion during the day, whether or not you made any overt response. In the second column, rate your most intense experience during that day in form of a number from 1 to 5 (1 = not at all intense, 5 = extremely intense). For example, if you became angry several times in one day, just rate that angry experience that felt most intense.

Rating Scale:

A = Total number of times experienced

B = Intensity of the most intense experience (from 1 to 5)

Emotion	Brief description	A	B
Amusement	You found a situation funny; felt like laughing; showed a sense of humor.	____	____
Boredom	You were uninvolved in a situation; couldn't concentrate; felt like yawning; time seemed to drag.	____	____
Fear	You sought to avoid a threatening situation; became nervous, afraid, or apprehensive.	____	____
Sadness	You were depressed, lonely, or blue; experienced a sense of loss or emptiness; felt on the verge of tears.	____	____
Affection	You were caring and considerate; experienced concern for another person's well-being; felt warm and friendly toward another.	____	____
Humility	You minimized your own importance or contribution; felt modest even in success.	____	____
Surprise	You were startled; caught off guard; astonished.	____	____
Curiosity	You wished to pursue an issue beyond average inquisitiveness; were aroused by the unexplained; were intrigued.	____	____
Sympathy	You understood and shared the feelings of another; empathized with another; felt compassion.	____	____
Shame	You felt regret for something you had done; blamed yourself for some mistake.	____	____

Rating Scale:

A = Total number of times experienced

B = Intensity of the most intense experience (from 1 to 5)

Emotion	Brief description	A	B
Pride	You were pleased with your own accomplishments; experienced satisfaction with a job well done.	____	____
Joy	You experienced keen pleasure; glowed with happiness; were jubilant.	____	____
Daring	You felt like taking a risk; did something that was unusual or potentially dangerous; acted in a brave or adventurous manner.	____	____
Hope	You wished that something good would happen, or that something bad would not happen, in spite of the odds against it.	____	____
Contempt	You "looked down" on a person or event; felt scorn, derision, or arrogance.	____	____
Sentimental	You remembered a past event with nostalgia; felt appreciation for some little thing.	____	____
Anger	You got mad when provoked; felt wrongfully treated; wanted to "set matters straight".	____	____
Disgust	You were repulsed, as if by a bad taste; felt aversion to something you found repugnant.	____	____

APPENDIX J

Peer Report

General Instructions

Your friend is taking part in an experimental study in the Department of Psychology. As part of that study, she is asking four acquaintances to complete the attached questionnaire. On the first part of the questionnaire you are asked to rate your friend on a number of personality characteristics, such as sensitivity and flexibility. The second part of the questionnaire pertains to emotional reactivity. You will be asked to rate the frequency with which your friend experiences particular emotions (anger, fear, sadness, joy, hope, etc.). The entire questionnaire requires only about 15 minutes to complete.

It is important that you be completely candid and accurate in your ratings. There is nothing in the questionnaire that might prove embarrassing to your friend; nevertheless, your responses will be kept strictly confidential. The purpose of the study is to relate common personality characteristics to everyday activities, and to examine how a person's own perception of his or her behavior corresponds with the perception of others.

Please complete the questionnaire within two days and return it in the enclosed envelope. Do not show your friend the ratings. Also, you need not sign the questionnaire, although we would appreciate the following information:

Friend's name _____ (not yours)

How long have you known your friend? _____

How close would you say you are with your friend?

____not very ____somewhat ____very close ____intimate

Are you____female or____male

How would you best describe your relationship (in a word or phrase; i.e., roommate, sister, best friend, boyfriend, father, etc.)? _____

Thank you for your assistance.

Part I

Please rate your friend on a scale from "1" (low) to "5" (high) on each of the following dimensions, in comparison to other people you know of the same age and sex.

A. How well would you say she appreciates the demands of group and social situations? (circle one)

1 2 3 4 5

B. How sensitive is she to the feelings and attitudes of others?

1 2 3 4 5

C. How well can she predict what others will do? (Does she seem to know what actions others are going to take?)

1 2 3 4 5

D. How rigid and inflexible is she in interpreting social behavior?

1 2 3 4 5

E. Is she able to evaluate her own behavior objectively, that is, as others would evaluate it?

1 2 3 4 5

F. How logical and deliberate is she (as opposed to being intuitive and impulsive)?

1 2 3 4 5

G. Would she make a good actor (for example, if asked to play the part of a "hillbilly", or of a tightrope walker with hiccups, could she do so convincingly)?

1 2 3 4 5

H. How reserved and self-controlled is she in everyday affairs?

1 2 3 4 5

Part II

The following is a list of specific emotions. Please rate the tendency of your friend to experience each emotion, using a 5-point scale. A rating of "1" means that your friend seldom experiences a particular emotion in comparison with others of the same age and sex. Conversely, a rating of "5" means that your friend tends to experience that emotion much more frequently than do others.

Emotion	Brief description	Rating (Seldom 1 2 3 4 5 Often)
Amusement	Finds a situation funny; laughs; shows a sense of humor.	1 2 3 4 5
Boredom	Is uninvolved in a situation; can't concentrate; yawns; time seems to drag.	1 2 3 4 5
Fear	Seeks to avoid a threatening situation; becomes nervous, afraid, or apprehensive.	1 2 3 4 5
Sadness	Is depressed, lonely or blue; a sense of loss or emptiness; feels on the verge of tears.	1 2 3 4 5
Affection	Is caring and considerate; experiences concern for another person's well-being; is warm and friendly toward another.	1 2 3 4 5
Humility	Minimizes own importance or contribution; feels modest even in success.	1 2 3 4 5
Surprise	Is startled; caught off guard; acts astonished.	1 2 3 4 5
Curiosity	Pursues an issue beyond average inquisitiveness;is aroused by the unexplained;is intrigued.	1 2 3 4 5
Sympathy	Understands and shares the feelings of another; empathizes with another; feels compassion.	1 2 3 4 5

Emotion	Brief description	Rating				
		Seldom				Often
Shame	Feels regret for something he or she has done; blames self for some mistake.	1	2	3	4	5
Pride	Is pleased with own accomplishments; experiences satisfaction with a job well done.	1	2	3	4	5
Joy	Experiences keen pleasure; glows with happiness; is jubilant.	1	2	3	4	5
Daring	Takes a risk; does something that is unusual or potentially dangerous; acts in a brave or adventurous manner.	1	2	3	4	5
Hope	Wishes that something good will happen, or that something bad will not happen, in spite of the odds against it.	1	2	3	4	5
Contempt	"Looks down" on a person or event is scornful, derisive, or arrogant.	1	2	3	4	5
Sentimental	Remembers past events with nostalgia; feels appreciation for little things.	1	2	3	4	5
Anger	Gets mad when provoked; feels wrongfully treated; wants to "set matters straight".	1	2	3	4	5
Disgust	Is repulsed, as if by a bad taste; feels aversion to things he or she finds repugnant.	1	2	3	4	5

APPENDIX K

Written Feedback (Phase II)

WRITTEN FEEDBACK

This study is designed to explore the relationship between personality, ability to become involved in emotional experiences, and reactivity in everyday life.

We are interested in the possible relationship between role-playing ability and emotional reactivity. The primary question is, do people with different levels of role-playing ability differ in their intensity and range of emotional experience. We are also interested in the kinds of strategies people use to imagine and visualize different emotional experiences. Are the strategies the same are do they vary with the emotion experienced? The results of this could lead to more precise induction methods tailored to a specific emotion.

Since we chose emotions which are quite different in their experience, it is of interest to us to see how easy or difficult it is to switch from one emotion to another during the experiment. Depending on the outcome, it might be more advantageous to introduce only one or two emotions during an experimental session.

We also want to look at the intensity with which these emotions are experienced and to what extent it varies from one emotion to another.

Finally, we are interested in how people experience emotions in everyday affairs and how this relates to the experience of emotions in the laboratory.

The long-range goal of this research is to contribute to the understanding of the relationship between personality, imagery, and emotion. In recent years, imagery and emotions have received a great deal of attention, not only in psychology but also in the medical field. It has been observed that imagining emotional situations can be helpful in psychotherapy. In medicine, it was found that emotional imagery can sometimes have enormous healing power. For example, imagining cancer cells being destroyed has been reported to facilitate recovery. This line of research will thus not only be of theoretical value but might also have potential practical applications.

We would like to thank you for your participation. Please do not discuss this experiment with friends, since they might participate in the study too.

APPENDIX L

Informed Consent (Phase II)

INFORMED CONSENT FORM
(Emotion, Imagery, and Psychophysiological Measurements)

The Department of Psychology requires that anyone who participates in a psychological study be informed beforehand as to the nature of the study. The present study is designed to investigate the ability of people to become involved in emotional experiences through the use of imagery. You will be asked to imagine five episodes in which you experience anger, sadness, fear, tranquility, and joy. You are to imagine each episode as vividly and intensely as possible for a period of two minutes. During each two-minute trial we will monitor your heart rate, skin conductance, and respiration. Following each trial you will be asked to fill out a brief questionnaire. After the five trials have been completed you are to write down a brief description of each episode and fill out a questionnaire on the techniques you used to become involved in the experience.

The experiment will last approximately 1 1/2 hours. If you have any questions about the experimental procedures feel free to ask the experimenter.

Following this laboratory session, you will be asked to keep a diary of your everyday emotional experiences for a two-week period. It does not take more than 15 minutes a day to record the diary. We will also ask you go give a short questionnaire to four acquaintances of yours.

All information and data collected will be completely confidential. You will receive $20 for your participation in this study. If at any time you decide that you do not wish to continue with the study, you may withdraw without any loss of pay.

If you agree to participate at this point, please sign below.

Signature _____

Date _____

APPENDIX M

Questionnaire 1 (Phase II)

Participant # _____ Sex _____ Date _____

The emotion you were asked to experience on this trial was: (circle one)

anger joy fear tranquility sadness

The following questions pertain to the episode you just experienced. In making your ratings please use the following rating scale. Be sure to answer each question by circling the appropriate number on the rating scales.

1 - NOT AT ALL
2 - A LITTLE
3 - SOMEWHAT
4 - QUITE A BIT
5 - VERY DEFINITELY

1. To what extent were you able to become involved in the experience?

NOT AT ALL | 1 | 2 | 3 | 4 | 5 | VERY DEFINITELY

2. Each of the words below describes feelings or moods. Please use this list to describe the feelings you experienced during the last trial. Work rapidly -- your first reaction is best. Please mark all words.

fearful	| 1 | 2 | 3 | 4 | 5 |
annoyed	| 1 | 2 | 3 | 4 | 5 |
joyful	| 1 | 2 | 3 | 4 | 5 |
scared	| 1 | 2 | 3 | 4 | 5 |
depressed	| 1 | 2 | 3 | 4 | 5 |
calm	| 1 | 2 | 3 | 4 | 5 |
elated	| 1 | 2 | 3 | 4 | 5 |
peaceful	| 1 | 2 | 3 | 4 | 5 |

furious	| 1 | 2 | 3 | 4 | 5 |
sorrowful	| 1 | 2 | 3 | 4 | 5 |
happy	| 1 | 2 | 3 | 4 | 5 |
fed up	| 1 | 2 | 3 | 4 | 5 |
sad	| 1 | 2 | 3 | 4 | 5 |
angry	| 1 | 2 | 3 | 4 | 5 |
tranquil	| 1 | 2 | 3 | 4 | 5 |
jittery	| 1 | 2 | 3 | 4 | 5 |
gloomy	| 1 | 2 | 3 | 4 | 5 |
jubilant	| 1 | 2 | 3 | 4 | 5 |
afraid	| 1 | 2 | 3 | 4 | 5 |
relaxed	| 1 | 2 | 3 | 4 | 5 |

3. For the following question, divide the preceeding 2-minute trial into three equal periods: a beginning third, middle third, and final third. Then rate the intensity of the imagined experience during each third of the trial.

a) First third - the experience was:

NOT AT ALL INTENSE \| 1 \| 2 \| 3 \| 4 \| 5 \| AS INTENSE AS THIS EMOTION COULD BE EXPERIENCED IN REAL LIFE

b) Second third - the experience was:

NOT AT ALL INTENSE \| 1 \| 2 \| 3 \| 4 \| 5 \| AS INTENSE AS THIS EMOTION COULD BE EXPERIENCED IN REAL LIFE

c) Final third - the experience was:

NOT AT ALL INTENSE \| 1 \| 2 \| 3 \| 4 \| 5 \| AS INTENSE AS THIS EMOTION COULD BE EXPERIENCED IN

APPENDIX N

Description of Emotional Experiences

Participant # _____ Sex _____ Date _____

You have just been asked to imagine five personal experiences that involved tranquility, anger, fear, sadness, and joy. Please describe the situations that you imagined. For example, what made you tranquil, angry, sad, etc. Be short and concise, yet be as explicit as possible.

1. The tranquil situation:

2. The angry situation:

3. The sad situation:

4. The joyful situation:

5. The fearful situation:

APPENDIX O

Questionnaire 2 (Phase II)

Participant # _____ Sex _____ Date _____

In this questionnaire you are asked about your experience of the imagined emotional episodes.

Explanation to Question 1:

People often use particular strategies to help them to become involved in an emotional experience. Some people, for example, actually visualize the experience, others use a more verbal approach, e.g. they think or talk about the episode to themselves without visualizing events; still others may use motor mimicry, such as grimacing, breathing, smiling, fist clenching, etc., to help create an emotional experience. Of course, such strategies are not mutually exclusive, they may be used in varying combinations, but often one strategy predominates.

The questions under (a) will ask you to rate the extent to which you used each strategy for attempting to become involved in the various emotions. Please circle all given strategies; circle a 1 (not at all) if you did not use a particular strategy; a 2 if you used it a little; and so forth.

Question 1: Tranquility

a) What kinds of strategies did you use to become involved in the tranquil situation? (If you are unsure of what is meant by strategies, read the explanation for part (a) again.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	VERY MUCH
Visual	1	2	3	4	5
Verbal	1	2	3	4	5
Motor	1	2	3	4	5
Other strategies: (please specify) _____	1	2	3	4	5

b) How successful were you in becoming involved in the tranquil situation?

1	2	3	4	5
NOT AT ALL SUCCESSFUL	MILDLY SUCCESSFUL	MODERATELY SUCCESSFUL	SUCCESSFUL	EXTREMELY SUCCESSFUL

c) In imagining a situation we may recall an event that actually happened or we can mentally construct (imagine) a completely new situation. In the present trial did you:

RECALL PRECISELY AN EVENT THAT ACTUALLY HAPPENED | 1 | 2 | 3 | 4 | 5 | MENTALLY CONSTRUCT A NEW EVENT

Question 1: Fear

a) What kinds of strategies did you use to become involved in the fearful situation? (If you are unsure of what is meant by strategies, read the explanation for part (a) again.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	VERY MUCH
Visual	1	2	3	4	5
Verbal	1	2	3	4	5
Motor	1	2	3	4	5

Other strategies: (please specify) _____

_____

1	2	3	4	5

b) How successful were you in becoming involved in the fearful situation?

1	2	3	4	5
NOT AT ALL SUCCESSFUL	MILDLY SUCCESSFUL	MODERATELY SUCCESSFUL		EXTREMELY SUCCESSFUL

c) In imagining a situation we may recall an event that actually happened or we can mentally construct (imagine) a completely new situation. In the present trial did you:

RECALL PRECISELY AN EVENT THAT ACTUALLY HAPPENED | 1 | 2 | 3 | 4 | 5 | MENTALLY CONSTRUCT A NEW EVENT

Question 1: Sadness

a) What kinds of strategies did you use to become involved in the sad situation? (If you are unsure of what is meant by strategies, read the explanation for part (a) again.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	VERY MUCH
Visual	1	2	3	4	5
Verbal	1	2	3	4	5
Motor	1	2	3	4	5

Other strategies: (please specify) _____

_____

1	2	3	4	5

b) How successful were you in becoming involved in the sad situation?

1	2	3	4	5
NOT AT ALL SUCCESSFUL	MILDLY SUCCESSFUL	MODERATELY SUCCESSFUL	SUCCESSFUL	EXTREMELY SUCCESSFUL

c) In imagining a situation we may recall an event that actually happened or we can mentally construct (imagine) a completely new situation. In the present trial did you:

RECALL PRECISELY AN EVENT THAT ACTUALLY HAPPENED | 1 | 2 | 3 | 4 | 5 | MENTALLY CONSTRUCT A NEW EVENT

Question 1: Anger

a) What kinds of strategies did you use to become involved in the angry situation? (If you are unsure of what is meant by strategies, read the explanation for part (a) again.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	VERY MUCH
Visual	1	2	3	4	5
Verbal	1	2	3	4	5
Motor	1	2	3	4	5

Other strategies: (please specify) _____

_____

1	2	3	4	5

b) How successful were you in becoming involved in the angry situation?

1	2	3	4	5
NOT AT ALL SUCCESSFUL	MILDLY SUCCESSFUL	MODERATELY SUCCESSFUL	SUCCESSFUL	EXTREMELY SUCCESSFUL

c) In imagining a situation we may recall an event that actually happened or we can mentally construct (imagine) a completely new situation. In the present trial did you:

RECALL PRECISELY AN EVENT THAT ACTUALLY HAPPENED | 1 | 2 | 3 | 4 | 5 | MENTALLY CONSTRUCT A NEW EVENT

Question 1: Joy

a) What kinds of strategies did you use to become involved in the joyful situation? (If you are unsure of what is meant by strategies, read the explanation for part (a) again.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	VERY MUCH
Visual	1	2	3	4	5
Verbal	1	2	3	4	5
Motor	1	2	3	4	5

Other strategies: (please specify) _____

_____

1	2	3	4	5

b) How successful were you in becoming involved in the joyful situation?

1	2	3	4	5
NOT AT ALL SUCCESSFUL	MILDLY SUCCESSFUL	MODERATELY SUCCESSFUL	SUCCESSFUL	EXTREMELY SUCCESSFUL

c) In imagining a situation we may recall an event that actually happened or we can mentally construct (imagine) a completely new situation. In the present trial did you:

RECALL PRECISELY AN EVENT THAT ACTUALLY HAPPENED | 1 | 2 | 3 | 4 | 5 | MENTALLY CONSTRUCT A NEW EVENT

In question 1 you were asked about the strategies you used to get involved in the emotional situations; in question 2 you will be asked about the emotional situations as you experienced them. There are many different combinations of answers between question 1 and question 2; it is important to note, however, that the answers are completely independent, in other words, your answers to question 2 do not depend on your answers to question 1.

Explanation to Question 2:

Sometimes when you imagine an experience, you retain a certain distance, almost like viewing a movie or reading a book. You are an observer of the events, even though you may be very emotionally involved. At other times, you may actually enter the situation and be present as though the event was happening to you in real life.

Question 2: Tranquility

a) In the case of tranquility, how would you describe your relationship to the imagined experience? (Rate each scale to the extent that it applies.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	ALMOST EXCLUSIVELY
As someone observing or thinking about the events	1	2	3	4	5
As someone participating in the events	1	2	3	4	5
Other: (please specify) _____					
	1	2	3	4	5

b) How much effort did it take (how difficult was it for you) to get involved in the tranquil situation?

1	2	3	4	5
NO EFFORT AT ALL	A LITTLE EFFORT	SOMEWHAT OF AN EFFORT	MUCH EFFORT	A GREAT DEAL OF EFFORT

Question 2: Fear

a) In the case of fear, how would you describe your relationship to the imagined experience? (Rate each scale to the extent that it applies.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	ALMOST EXCLUSIVELY
As someone observing or thinking about the events	1	2	3	4	5
As someone participating in the events	1	2	3	4	5
Other: (please specify) _____					
	1	2	3	4	5

b) How much effort did it take (how difficult was it for you) to get involved in the fearful situation?

1	2	3	4	5
NO EFFORT AT ALL	A LITTLE EFFORT	SOMEWHAT OF AN EFFORT	MUCH EFFORT	A GREAT DEAL OF EFFORT

Question 2: Sadness

a) In the case of sadness, how would you describe your relationship to the imagined experience? (Rate each scale to the extent that it applies.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	ALMOST EXCLUSIVELY
As someone observing or thinking about the events	1	2	3	4	5
As someone participating in the events	1	2	3	4	5
Other: (please specify) _____					
_____	1	2	3	4	5

b) How much effort did it take (how difficult was it for you) to get involved in the sad situation?

1	2	3	4	5
NO EFFORT AT ALL	A LITTLE EFFORT	SOMEWHAT OF AN EFFORT	MUCH EFFORT	A GREAT DEAL OF EFFORT

Question 2: Anger

a) In the case of anger, how would you describe your relationship to the imagined experience? (Rate each scale to the extent that it applies.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	ALMOST EXCLUSIVELY
As someone observing or thinking about the events	1	2	3	4	5
As someone participating in the events	1	2	3	4	5
Other: (please specify) _____					
	1	2	3	4	5

b) How much effort did it take (how difficult was it for you) to get involved in the angry situation?

1	2	3	4	5
NO EFFORT AT ALL	A LITTLE EFFORT	SOMEWHAT OF AN EFFORT	MUCH EFFORT	A GREAT DEAL OF EFFORT

Question 2: Joy

a) In the case of joy, how would you describe your relationship to the imagined experience? (Rate each scale to the extent that it applies.)

	NOT AT ALL	A LITTLE	SOMEWHAT	QUITE A BIT	ALMOST EXCLUSIVELY
As someone observing or thinking about the events	1	2	3	4	5
As someone participating in the events	1	2	3	4	5
Other: (please specify) _____					
	1	2	3	4	5

b) How much effort did it take (how difficult was it for you) to get involved in the joyful situation?

1	2	3	4	5
NO EFFORT AT ALL	A LITTLE EFFORT	SOMEWHAT OF AN EFFORT	MUCH EFFORT	A GREAT DEAL OF EFFORT

Question 3:

How difficult was it for you to switch from one emotion to another?

	NOT AT ALL DIFFICULT	A LITTLE DIFFICULT	SOMEWHAT DIFFICULT	QUITE A BIT DIFFICULT	EXTREMELY DIFFICULT
From _____ To _____	1	2	3	4	5
From _____ To _____	1	2	3	4	5
From _____ To _____	1	2	3	4	5
From _____ To _____	1	2	3	4	5

Explain your answers: _____

_____

_____

_____

_____

Question 4:

It has been observed that physiological reactivity, and perhaps involvement in the kind of emotionally relevant tasks used in this experiment, may vary as a function of the phase of the person's menstrual cycle. In order to help control for this potentially confounding variable, please estimate the phase of the menstrual cycle you are in right now (answering this question is optional).

The prototypic menstrual cycle begins with the first day of menstruation and lasts approximately 28 days, or four 7-day periods. Of course, your menstrual cycle may differ in length or regularity from the prototype. Divide your cycle into four roughly equal periods and indicate on the following chart the period or phase you are now in.

Menstrual and Immediate Postmenstrual Phase:	First week (roughly day 1-7)	_____
Preovulatory Phase:	Second week (day 8-14)	_____
Postovulatory Phase:	Third week (day 15-21)	_____
Premenstrual Phase:	Fourth week (day 22-28)	_____
My mentrual cycle is irregular or absent, I cannot make an accurate estimate.		_____

Are you currently using oral contraceptives or other medicine that might disrupt your menstrual cycle? Yes_____ No_____

APPENDIX P

Table A

Correlations of Physiological Change Scores with Respective Baseline Recordings for Target Emotions

	First third	Second third	Last third
Heart rate baseline			
Fear	-.03	-.06	0
Sadness	-.07	-.13	-.22
Anger	.09	-.08	-.01
Joy	-.12	-.17	-.10
Respiration baseline			
Fear	-.42	-.35	-.29
Sadness	-.21	-.21	-.27
Anger	-.45	-.40	-.44
Joy	-.33	-.23	-.37
Skin conductance baseline			
Fear	.33	.31	.27
Sadness	.10	.08	.08
Anger	.28	.32	.27
Joy	.12	.14	.13

APPENDIX Q

Table B

Mean Correlations and Reliabilities among Peer Raters for Individual Emotions

Emotion	Peer raters	
	Correlation	Reliability[a]
Amusement	.13	.37
Boredom	.05	.17
Fear	.09	.28
Sadness	.27*	.58
Affection	.18	.47
Humility	.13	.36
Surprise	.11	.33
Curiosity	.03	.11
Sympathy	.25*	.57
Shame	.10	.32
Pride	.15	.43
Joy	.07	.21
Daring	.24*	.55
Hope	.09	.28
Contempt	.24*	.56
Sentimental	.10	.31
Anger	.28*	.60
Disgust	.20	.50
Make good actor	.25*	.57

*$p < .05$. two-tailed.
[a] Cronbach's alpha.

APPENDIX R

Table C

Means and Standard Deviations of Subjects' Frequency and Intensity Ratings and Peer Emotionality Ratings for Individual Emotions

	Subject Frequency		Subject Intensity		Peer Emotionality	
	M	SD	M	SD	M	SD
Amusement	5.83	4.85	3.88	.62	4.47	.42
Affection	3.86	3.41	3.90	.55	4.29	.52
Hope	3.30	3.67	3.95	.69	3.76	.54
Joy	3.22	3.09	3.90	.53	4.17	.55
Sentimental	2.67	2.91	3.78	.71	4.16	.53
Boredom	2.38	1.79	3.57	.65	2.14	.55
Sympathy	2.37	2.19	3.59	.63	4.20	.58
Sadness	1.99	2.34	3.42	.76	2.20	.72
Pride	1.87	1.88	3.48	.58	4.02	.54
Curiosity	1.87	1.90	3.40	.63	3.59	.58
Anger	1.48	1.75	3.54	.73	2.98	.86
Contempt	1.40	1.62	3.31	.77	1.92	.72
Surprise	1.36	1.40	3.52	.71	3.03	.62
Shame	1.33	1.47	3.34	.75	2.94	.62
Humility	1.23	1.28	3.08	.66	3.31	.63
Daring	1.21	1.66	3.33	.70	3.22	.77
Disgust	1.13	1.08	3.29	.78	2.75	.76
Fear	1.07	1.07	3.15	.73	2.60	.66

APPENDIX S

Table D

Correlations among Personality Inventories for Males (N = 205) and Females (N = 373) in Phase I and Females in Phase II (N = 72)

Personality inventory	1	2	3	4	5	6
Males (Phase I)						
1. Extraversion						
2. Neuroticism	-.31					
3. Lie Scale	-.07	-.16				
4. IDQ (verbal)	.26	-.14	-.06			
5. IDQ (visual)	.04	.15	-.02	.21		
6. Role-playing	.15	.21	-.05	.23	.39	
7. Affect intensity	.05	.31	.05	.02	.21	.25
Females (Phase I)						
1. Extraversion						
2. Neuroticism	-.20					
3. Lie Scale	-.14	-.17				
4. IDQ (verbal)	.27	-.17	0			
5. IDQ (visual)	.19	.04	0	.12		
6. Role-playing	.31	.18	-.08	.35	.37	
7. Affect intensity	.04	.40	-.07	-.07	.14	.21

	1	2	3	4	5	6	7
Females (Phase II)							
1. Extraversion							
2. Neuroticism	-.13						
3. Lie Scale	-.02	-.27					
4. IDQ (verbal)	.30	-.27	.19				
5. IDQ (visual)	.19	.16	.10	.19			
6. Role-playing	.37	.31	-.01	.30	.50		
7. Affect intensity	.11	.53	-.14	-.16	.24	.25	
8. Mental Imagery	-.18	.14	-.09	-.56	-.22	-.37	-.06

Note. Correlations below .14 are not significant at $p < .05$ for males; correlations below .12 are not significant at $p < .05$ for females (Phase I). Correlations below .24 are not significant at $p < .05$ for females (Phase II).

REFERENCES

Andreassi, J. L. (1980). Psychophysiology. Oxford: Oxford University Press.

Arnold, M. B. (1970). Feelings and emotions: The Loyola symposium. New York: Academic Press.

Averill, J. R. (1974). An analysis of psychophysiological symbolism and its influence on theories of emotion. Journal for the Theory of Social Behavior, 4, 147-190.

Averill, J. R. (1976). Emotion and anxiety: Sociocultural, biological, and psychological determinants. In M. Zuckerman & C. D. Spielberger (Eds.), Emotion and anxiety: New concepts, methods and applications. New York: LEA-John Wiley.

Averill, J. R. (1980a). A constructivist view of emotion. In R. Plutchik & H. Kellerman (Eds.), Theories of emotion. New York: Academic Press.

Averill, J. R. (1980b). On the paucity of positive emotions. In K. R. Blankstein, R. Pliner, & J. Polivy (Eds.), Assessment and modification of emotional behavior. New York: Plenum.

Averill, J. R. (1982). Anger and aggression: An essay on emotion. New York: Springer Verlag.

Averill, J. R. (1983). Studies on anger and aggression: Implications for theories of emotion. American Psychologist, 38, 1145-1160.

Averill, J. R. (1984). Social bases of emotional behavior. Grant proposal.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Barber, T. X., & Hahn, K. W. (1964). Experimental studies in "hypnotic" behavior: Physiologic and subjective effects of imagined pain. Journal of Nervous and Mental Disease, 139, 415-425.

Bauer, R. M., & Craighead, W. E. (1979). Psychophysiological responses to the imagination of fearful and neutral situations: The effects of imagery instructions. Behavior Therapy, 10, 389-403.

Betts, G. H. (1909). The distribution and functions of mental imagery. New York: Columbia University Teachers College, Contributions to Education Series, No. 26.

Brown, S. L., & Schwartz, G. E. (1980). Relationships between facial electromyography and subjective experience during affective imagery. Biological Psychology, 11, 49-62.

Carroll, D, Marzillier, J. S., & Merian, S. (1982). Psychophysiological changes accompanying different types of arousing and relaxing imagery. Psychophysiology, 19, 75-82.

Cheek, J. M. (1982). Aggregation, moderator variables, and the validity of personality tests: A peer-rating study. Journal of Personality and Social Psychology, 43, 1254-1269.

Davidson, R. J., & Schwartz, G. E. (1976). Patterns of cerebral lateralization during biofeedback versus the self-regulation of emotion: Sex differences. Psychophysiology, 13, 62-68.

Dekker, J., & Everaerd, W. (1988a). Attentional effects on sexual arousal. Psychophysiology, 25, 45-54.

Dekker, J., & Everaerd, W. (1988b). Two different kinds of processing of information on the sexual response? Unpublished manuscript.

Diener, E., Larsen, R. J., Levine, S., & Emmons, R. A. (1985). Intensity and frequency: Dimensions underlying positive and negative affect. Journal of Personality and Social Psychology, 48, 1253-1265.

Edwards, C. (1965). The Stanislavski heritage. New York: New York University Press.

Evans, I. M., & Kamemoto, W. S. (1973). Reliability of the short form of Betts Questionnaire on Mental Imagery: replication. Psychological Reports, 33, 281-282.

Eysenck, H. J., & Eysenck, J. B. G. (1964). Manual for the Eysenck Personality Inventory. London: University of London Press.

Euse, F. J., & Haney, J. N. (1975). Clarity, controllability, and emotional intensity with introversion, neuroticism, and subjective anxiety. Perceptual and Motor Skills, 40, 443-447.

Fletcher, K. E., & Averill, J. R. (1984). A scale for the measurement of role-playing ability. Journal of Research in Personality, 18, 131-149.

Fridlund, A. J., Schwartz, G. E., & Fowler, S. C. (1984). Pattern recognition of self-reported emotional state from multiple-site facial EMG activity during affective imagery. Psychophysiology, 21, 622-637.

Friedman, D. (1966). A new technique for the systematic desensitization of phobic symptoms. Behavior Research & Therapy, 4, 139-140.

Grossberg, J. M., & Wilson, K. M. (1968). Physiological changes accompanying the visualization of fearful and neutral situations. Journal of Personality and Social Psychology, 10, 124-133.

Haney, J. N., & Euse, F. J. (1976). Skin conductance and heart rate responses to neutral, positive, and negative imagery: Implications for covert behavior therapy procedures. Behavior Therapy, 7, 494-503.

Hastrup, J. L. & Light, K. C. (1984). Sex differences in cardiovascular stress responses: Modulation as a function of mentrual cycle phases. Journal of Psychosomatic Research, 28, 475-483.

Hermecz, D. A., & Melamed, B. G. (1984). The assessment of emotional imagery training in fearful children. Behavior Therapy, 15, 156-172.

Hiscock, M. (1978). Imagery assessment through self-report: What do imagery questionnaires measure? Journal of Consulting and Clinical Psychology, 46, 223-230.

Izard, C. E. (1977). Human Emotions. New York: Plenum Press.

Kane, J. S., & Lawler III, E. E. (1978). Methods of peer assessment. Psychological Bulletin, 85, 555-586.

Ketterer, M. W. (1982). Lateralized representation of affect, affect cognizance and the coronary-prone personality. Biological Psychology, 15, 171-189.

Kraft, T. (1970). Systematic desensitization using emotional imagery only. Perceptual and Motor Skills, 30, 293-294.

Lang, P. J. (1977). Imagery in therapy: An information processing analysis of fear. Behavior Therapy, 8, 862-886.

Lang, P. J. (1979). A bio-informational theory of emotional imagery. Psychophysiology, 16, 495-512.

Lang, P. J., Melamed, B. G., & Hart, J. D. (1970). A psychophysiological analysis of fear modification using an automated desensitization procedure. Journal of Abnormal Psychology, 76, 220-234.

Lang, P. J., Kozak, M. J., Miller, G. A., Levin, D. N., & McLean, A. (1980). Emotional imagery: Conceptual structure and pattern of somato-visceral response. Psychophysiology, 17, 179-192.

Lang, P. J., Levin, D. N., Miller, G. A., & Kozak, M. J. (1983). Fear behavior, fear imagery, and the psychophysiology of emotion: The problem of affective response integration. Journal of Abnormal Psychology, 92, 276-306.

Larsen, R. J. (1984). Theory and measurement of affect intensity as an individual difference characteristic. Dissertation Abstracts International, 45, 2297B. (University Microfilms No. 84-22112).

Larsen, R. J., & Diener, E. (1987). Emotional response intensity as an individual difference characteristic. Journal of Research in Personality, 21, 1-39.

Larsen, R. J., & Diener, E., & Emmons, R. A. (1986). Affect intensity and reactions to daily life events. Journal of Personality and Social Psychology, 51, 803-814.

Lazarus, A. A., & Abramowitz, A. (1962). The use of "emotive imagery" in the treatment of children's phobia. Journal of Mental Science, 108, 191-195.

Lyman, B. (1984). An experiential theory of emotion: A partial outline with implications for research. Journal of Mental Imagery, 8, 77-86.

Lyman, B., Bernardin, S., & Thomas, S. (1980). Frequency of imagery in emotional experience. Perceptual and Motor Skills, 50, 1159-1162.

Mandler, G. (1984). Consciousness, imagery, and emotion - with special reference to autonomic imagery. Journal of Mental Imagery, 8, 87-94.

Marzillier, J. S., Carroll, D., & Newland, J. R. (1979). Self-report and physiological changes accompanying repeated imagining of a phobic scene. Behaviour Research and Therapy, 17, 71-77.

Moore, S. (1973). Stanislavski Today. New York: American Center for Stanislavski Theatre Art.

Novaco, R. W. (1975). Anger control: The development and evaluation of an experimental treatment. Lexington: Mass.: Lexington Books/D.C. Heath.

Paivio, A. (1971). Imagery and verbal processes. New York: Holt, Rinehart, and Winston. Reprinted by Lawrence Erlbaum Associates, Hillsdale, N.J.

Paivio, A., & Harshman, R. (1983). Factor analysis of a questionnaire on imagery and verbal habits and skills. Canadian Journal of Psychology, 37, 461-483.

Perls, F. S. (1973). The Gestalt approach and eyewitness to therapy. Palo Alto, Calif.: Science and Behavior Books.

Petrie, A. (1967). Individuality in pain and suffering. Chicago: University of Chicago Press.

Plutchik, R. (1980). Emotion: A psychoevolutionary synthesis. New York: Harper and Row.

Plutchik, R. (1984). Emotions and imagery. Journal of Mental Imagery, 8, 105-112.

Qualls, P. J. (1982-83). The physiological measurement of imagery: An overview. Imagination, Cognition and Personality, 2, 89-101.

Rachman, S. (1973). Studies in desensitization: II. Flooding. Behavior Research & Therapy, 11, 265-270.

Richardson, A, & Taylor, C. C. (1982). Vividness of memory imagery and self-induced mood change. British Journal of Clinical Psychology, 21, 111-117.

Roberts, R. J., & Weerts, T. C. (1982). Cardiovascular responding during anger and fear imagery. Psychological Reports, 50, 219-230.

Sarbin, T. R., & Coe, W. C. (1972). Hypnosis: A social psychological analysis of influence communication. New York: Holt, Rinehart, and Winston.

Schwartz, G. E., Brown, S. L., & Ahern, G. L. (1980). Facial muscle patterning and subjective experience during affective imagery: Sex differences. Psychophysiology, 17, 75-82.

Schwartz, G. E., Fair, P. L., Salt, P., Mandel, M. R., & Klerman, G. L. (1976). Facial expression and imagery in depression: An electromyographic study. Psychosomatic Medicine, 38, 337-347.

Schwartz, G. E., Weinberger, D. A., & Singer, J. A. (1981). Cardiovascular differentiation of happiness, sadness, anger, and fear following imagery and exercise. Psychosomatic Medicine, 43, 343-364.

Sheehan, P. W. (1967a). A shortened form of Betts' Questionnaire upon mental imagery. Journal of Clinical Psychology, 23, 386-389.

Sheehan, P. W. (1967b). Reliability of a short test of imagery. Perceptual and Motor Skills, 25, 744.

Singer, J. L. (1974). Imagery and daydream methods in psychotherapy and behavior modification. New York: Academic Press.

Snyder, M. (1974). The self-monitoring of expressive behavior. Journal of Personality and Social Psychology, 30, 526-537.

Sokolov, A. N. (1972). Inner speech and thought. New York: Plenum Press.

Solomon, R. C. (1977). The passions. Garden City, NY: Anchor Press/Doubleday.

Sommers, S. (1981). Emotionality reconsidered: The Role of cognition in emotional responsiveness. Journal of Personality and Social Psychology, 41, 553-561.

Stanislavski, C. (1936). An actor prepares. New York: Theatre Arts Books.

Stern, R. M., & Lewis, N. L. (1968). Ability of actors to control their GSRs and express emotions. Psychophysiology, 4, 294-299.

Strelau, J. (1982). Biologically determined dimensions of personality or temperament. Personality & Individual Differences, 3, 355-360.

Stricklin, A. B., & Penk, M. L. (1980). Vividness and control of imagery in personality types. Journal of Mental Imagery, 4, 111-114.

Tomkins, S. S. (1981). The quest for primary motives: Biography and autobiography of an idea. Journal of Personality and Social Psychology, 41, 306-329.

Weerts, T. C., & Lang, P. J. (1978). Psychophysiology of fear imagery: Differences between focal phobia and social performance anxiety. Journal of Consulting & Clinical Psychology, 46, 1157-1159.

Westcott, T. B., & Rosenstock, E. (1976). Reliability of two measures of imagery. Perceptual and Motor Skills, 42, 1037-1038.

White, K. D., Ashton, R., & Law, H. (1974). Factor analyses of the shortened form of Betts' Questionnaire Upon Mental Imagery. Australian Journal of Psychology, 26, 183-190.

White, K. D., Ashton, R., & Law, H. (1978). The measurement of imagery vividness: Effects of format and order on the Betts' Questionnaire Upon Mental Imagery. Canadian Journal of Behavioural Science, 10, 68-78.

Willerman, L., Turner, R. G., & Peterson, M. (1976). A comparison of the predictive validity of typical and maximal personality measures. Journal of Research in Personality, 10, 482-492.

Wolpe, J. (1958). Psychotherapy by reciprocal inhibition. Stanford: Stanford Univeristy Press.

Yablonsky, L. (1976). Psychodrama: Resolving emotional problems through role-playing. New York: Basic Books.